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LANGUAGE PERFORMANCE OF IDENTICAL TWINS OF PRESCHOOL AGE

by

© Brian Francis Stelck

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Language Performance in Identical Twins of Preschool Age" submitted by Brian Francis Stelck in partial fulfilment of the requirements for the degree of Master of Education.

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Date June 22, 1978

ABSTRACT

The purpose of this study was to explore the language performance of identical twins. The language development of identical twins appears to be affected by a dominant-subordinate relationship and this study looked at those effects.

From six pairs of four year old identical twins, three male and three female, verbal language utterances were tape-recorded. The language utterances were stimulated using four tasks. The first task performed in the study elicited language from each twin pair in front of a mirror, responding to questions about their mirror images. The second task stimulated spontaneous oral language in a play situation as both co-twins explored a stimulus array provided by the examiner. The third and fourth tasks elicited oral responses from the members of each twin pair as they individually responded to questions about the stimulus materials.

The twin pairs were observed for physical dominance, and a dominant and subordinate member was determined for each pair. The determination was a three-way agreement of dominance as determined by the examiner's observation of acts of aggression, parental statement of dominance and the ratings of the survey instrument.

The verbal utterances of each subject were analysed according to six measures of language performance. A Developmental Sentence Score, mean length of utterance, patterns of interrogative and pronoun emergence, maze usage and the use of autonomous language were determined from the transcribed language protocols. The analysis focussed on comparisons of the twins' scores grouped as either dominant or subordinate.

A dominant-subordinate relationship was determined in five of the six pairs of identical twins. This study determined that the co-twins placed in the subordinate position generally exhibited language skills which were superior to those of the dominant co-twin. A statistically significant difference, in favor of subordinate members of the twin pairs, was found in the analysis of Developmental Sentence Scores, use of interrogative forms and the use of pronoun forms. The use of mazes and the mean length of utterance were not affected by the dominance of the twin pair.

The use of autonomous language was identified only in the language of the male twin pairs. The frequency of use was minimal and analysis revealed that the autonomous language used by each child was specific to that child only. The twins in this study used some inaccurate replications of standard language forms but did not appear to be creating their own language.

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CHAPTER I

I. INTRODUCTION

"Goen bin at door?"
"We havta given our pens go home."
Stelck (1976)

Twin studies report that twins have some difficulty in learning to speak and to use language (Day, 1932; Davis, 1937). It has been reported that twins create a language of their own which is comprehensible only to the twins (Luria and Yudovich, 1959; Romanes, 1889; Scheinfeld, 1973). However, following an investigation of the language of five year old twins, Stelck (1976) reported that the twins' language was not incomprehensible but rather an inaccurate replication of standard language. For example the utterance, "Goen bin at door?" was comprehensible in the situation in which it occured.

Twins do differ in language ability from non twin children, partly because of their genetic makeup and partly because of their unique environmental experience (Munsinger and Douglass (1976) reported an acsending language performance ability from identical twins through fraternal twins, with greater language ability for siblings, through half siblings to the single child.

The production of language is initially a "means of getting things done" (Halliday, 1969), a function of social necessity, and a method of satisfying needs. The social environment in which the language is contained may determine a good deal of the environmentally bound language. Koch (1966) reported that dominance, although more noticeable in fraternal twins, does occur in varying degrees in all twin pairs (p. 143). No study to date has made use of dominance factors to determine if a restriction in language occurs because of that dominance or conversely that the subordinate position may be causal in creating the social necessity for the child to acquire language in order to get things done. The extent to which language is employed may reveal the effect that social position has on language production and development. Cossitt (1966) stated that lack of social necessity is a probable cause of some of the language defiency recognized in twins. The movement of children's language from implicit (child assuming a shared context) to explicit is assumed to be experientially specific. The study of the differences in explicit language performance between the members of a twin pair would facilitate the isolation of the environmental effects on language. The shared context of the environment may be an influencing factor in determining the degree to which twins create their own language. The other major determining factor may be the amount of interaction which the twins have with adults.

II. PURPOSE OF THE STUDY

The purpose of this study is: (1) to investigate the oral language performance of four-year-old identical twins. (2) to attempt to identify the language patterns and the performance levels of the language of twins. (3) to investigate dominance of twins in relationship to language development. (4) to identify an occurrence of twins creating a language of their own.

III. DEFINITION OF TERMS

For the purpose of this study the definitions that are contained in this section have been used throughout the study.

Monozygot

Monozygotic (mz) or identical twins carry identical gene structures, are always of the same sex, male or female, and originate from the same fertilized ovum. The ovum divides and develops usually with a common placenta and amniotic sac. Identical twins have identical hereditary traits and the observed difference between twins is assigned to environmental factors.

Dizygot

Dizygotic or fraternal twins originate from two different ovum fertilized by two different spermotozoan and usually develop with different placentas and amniotic sacs. As the genetic makeup of the twins differ, so, too, may the sex of the twins.

Dizygotic twins have different hereditary traits and, although genetic and environmental factors differ, there is a closer sharing of environment than there is with ordinary siblings.

Dominance

Dominance is defined as a type of personality marked by a tendency to seek control over others. Marked individual differences in temperamental repertoires assist in recognizing the existence of a super-subordinate intrageminal status, (Koch, 1966, p. 143).

Operationally, dominance is defined as at least double the observable physically aggressive acts performed by one individual in seeking control over another individual.

Maze

Maze is defined as a group of words, sounds or word fragments that are unattached to the structure of the sentences. The maze may be a noise (uh, er, um), a repeat, (the repetition of words or parts of words), or an edit, (resulting tangles of a word from corrections).

Utterance

Utterance is defined as a series of verbal words and mazes connected together by the speaker into a pattern, The utterance is marked by beginning and ending inflections. An utterance may end either by rising or falling inflection or by the cessation of speech.

IV. RESEARCH QUESTIONS

For the purpose of this study three major research questions were formulated:

1. Does an inverse relationship exist between twin dominance and language ability in the use of language and the structure of language performed? (i.e., the dominant child having the lesser language ability.)
2. To what extent do identical twins use situation specific or autonomous language? (i.e., language which creates meaning confusions when not totally situation maintained.)
3. Is there evidence to support the Hale (1886) theory that twins, to some extent, "create their own language."?

V. PLAN OF THE STUDY

To achieve the purpose of the study a sample was drawn from pairs of identical twins, aged four years. The Edmonton Twin and Triplet Club was instrumental in providing the names of the twins. Three male and three female pairs of English language twins comprised the sample.

Oral language samples were obtained, tape-recorded and accompanied by examiner notes. Four major tasks were used to facilitate the language collection. For the purpose of the study the tasks were entitled:

1) The Mirror Task - The Mirror Task was so named because of the utilization of a full length mirror to facilitate the identification and possession of body parts.
2) The McCarthy and Day Task (or M.D. Task) - The M D Task was so named because of its origin in the work of McCarthy (1930) and Day (1932). The task involved the exploration of stimulus material by the children and the recording of the language generated by each child.
3) The Twin with Adult Task (or T.A. Task) - The third task, the T.A. Task, involved the collection of a language sample while each co-twin was alone with the examiner.
4) The Story Task - The fourth task, the Story Task, required each child first to tell or retell any familiar story

and secondly, to tell a story using a
picture book stimulus.

All responses were tape-recorded for transcription.

Additional Data

Additional data required for the study included the determination of zygosity and the determination of dominance.

The determination of zygosity was based on parental statement as well as observation by the examiner.

The determination of twin dominance was based on the inter-reliability of the following items:

1) the statement of dominance as perceived by the parents.
2) the observation of the examiner during the sampling session.
3) the pattern of temperament as surveyed with the Temperamental Quality Inventory. (Thomas, Chess, Birch, 1970)

VI. ANALYSIS OF THE DATA

The language samples generated were studied in terms of the effect of dominance of the twins on:

1) Developmental Sentence Scores (Lee & Canter, 1971)
2) Interrogative forms used (Trantham & Pedersen, 1976)
3) Mean length of utterance
4) Pronoun and possessive usage
5) Maze usage (Anderson, 1972)

The language samples were studied in terms of the autonomous words or "Situation Specific meaning confusions" (Luria and Yudovich, 1959) in order to determine the degree to which the twins "created" their own language.

VII. LIMITATIONS OF THE STUDY

The limitations of the study are acknowledged and stated in this section.

The small representational sample used will affect the application to a population. The determination of zygosity based on parental report may be a confounding problem. The limitations imposed by the definition of dominance may impose replication difficulties. The tasks designed may limit, to some extent, the elicitation of oral language. The isolation of genetic vs. environmental factors is a theoretical issue and subject to generalization difficulties.

VIII. SIGNIFICANCE OF THE STUDY

It is hoped that this study will isolate some of the language deficiency areas of twins in order that some constructive guidance may be given to parents of twins.

Since the identification of problems preceeds the implementation of solutions, it is hoped that identification of factors affecting the language disabled will lead to the initiation of procedures to offset or correct those factors.

Furthermore, the general knowledge of language acquisition will be enhanced by this study which looks at language performance of four year olds. The study will also contribute to the knowledge available regarding preschool children.

IX. THE ORGANIZATION OF THE STUDY

Chapter I gives a general introduction to the study and the research questions. Chapter II presents a rationale, and review of the related studies and literature. The design of the study is discussed in Chapter III, followed in Chapter IV by the findings of the research. Chapter V summarizes and draws some conclusions about the research.

CHAPTER II

A REVIEW OF RELATED LITERATURE

The present chapter contains a survey of the literature which is relevant to the study of oral language performance as it appears in the language production of twins. The chapter commences with a discussion of the relevance of twin studies and proceeds through discussions of the development, achievement, and personality of twins. The second major portion of Chapter II discusses language performance studies and language development in twins as reported in the literature.

Perspective on Twins

Twins, although somewhat of a novelty, do occur in the order of 4.6 twin births per hundred births. Statistics Canada (1973) reported that this occurrence represented 9.3 percent of the total population are twins. The instance of identical twins is a two-fifths portion of the twin population.

The uniqueness of twins was noted by the ancients in mythology, fantasy and folklore. Twins were the work and majesty of the gods. The Greek gods of Castor and Polydeuces were the twin sons of Zeus and are recognized as the twin constellation Gemini. The Roman gods of Romulus and Remus were twins as were the Scandinavian pair of Balder and Hoder.

Scheinfeld (1973) revealed that the mythology of the North American Indian tribes contained twin figures. The first born of the twins was a doer of good, whereas the second born of the pair was evil or mystical. Mortal twins were considered bad luck and numerous tribes killed either both of the pair or the evil second born twin.

The association with evil and disaster has tended to penetrate many primitive cultural folklores and the ramifications have been death for the twins. Veith (1960) reported the practise of killing one or both twins was widespread among primitive peoples and occurred amongst the Eskimos, Australian Aborigines, Californian Indians, some Navahos, the Ainus of Japan, numerous African tribes, the Incas of Peru, peoples of the Pacific Islands and many American Indian tribes. The cultural differences,although seemingly very diverse amongst these primitive people,did not alter their attitudes towards the twin occurrence. Evil, magic and superstition determined the "fate" of an unnatural and certainly non-normal birth. Superstition and folklore do not disappear readily nor do the attitudes associated with that lore.

The attitudes and ideas about twins in twentieth century North America follow fairly closely the European examples. The differences observed between twins in a pair as well as the novelty of twins have been the subject or source of merriment and intrigue in many areas of Europe. Literary works involving twins as the source of merriment are numerous. Intrigue is often added to literary works by using the confusions involved in the identification of identical twins.

Shakespeare is reported to have had a set of opposite sex fraternal twins which may have prompted him to write both The Comedy of Errors and Twelfth Night. Thornton Wilder, himself a twin, included a twin pair in his novel The Bridge of San Luis Rey, as does Dumas the The Corsican Brothers. Mark Twain used the twin or look-a-like idea in The Prince and The Pauper. The pair in Lewis Carroll's Through The Looking Glass, Tweedledum and Tweedledee, were twins as were the comic children in The Captain and The Kids and The Katzenjammer Kids. Through the literature and folklore one can see the development of attitudes and beliefs about twins and discover the origins of the beliefs and misbeliefs that seem to shape the treatment of twins today.

Twin Studies

Over a century ago a cousin of Charles Darwin, Francis Galton, began to study the hereditary factors of look alike twins. The article "The History of Twins" contained in Fraser's Magazine (1875), attempted to throw light on the problems of the influence of nature (heredity) and nurture (environment) upon the influence of nature (heredity) and nurture (environment) upon the individual. Galton, by 1907, had initiated the use of the method of co-twin control for furthering twin research. The twin study method, as it is referred to, involves the use of co-twin as a control, to whom no treatment is given, while the other member of the pair receives some treatment or training. Any changes that occur are attributed to the treatments, as most other conditions are maintained as relatively identical. It is possible to identify where developmental similarities occur, in cases where common development can be observed, even though treatment of one co-twin was varied. The use of the twin study method has been continued to further the research into heredity and environment.

The studies which involve identical twins are in two categories: one, those involving twins reared together and two, twins reared apart, the latter being far less common.

Most twin studies involve the use of fraternal pairs and identical pairs raised together as were the studies of Koch (1966), Cossitt (1966), Husen (1959), and Day (1932).

The case studies of McGraw (1935) presented identical twin pairs raised together whereas the studies of Burks (1942) and Saudek (1934) presented case studies of identical twins reared apart. Shields (1962) made comparisons between twins reared together and twins reared apart. Luria and Yudovich (1959) studied children reared together but given differing treatments.

The study of heredity and environment conducted by Newman, Freeman, and Holzinger (1937) stated that the close likeness found in identical twins is an indication of heredity acting as the dominant factor in development. Newman et al. suggested that,because the inherited factor is exactly the same in identical twins, any difference that might be recognizable as the twins develop would indeed be environmentally produced. Comparisons of common traits reveal whether or not separated identical twins develop alike, in spite of the effects of differing environments.

Criticisms of the twin study method have been raised by biologists and geneticists like Neel and Schill (1954), who pointed out that perhaps some of the prenatal factors such as position of foetuses or order of delivery may cause an appearance of non-genetic development. Shields (1962) stated, "It is the genes that are inherited, not finally formed physical characteristics or traits of behavior ... Just because heredity may be important for a certain trait there is no reason to assume that the trait cannot be effectively influenced by environmental measures." (p. 7)

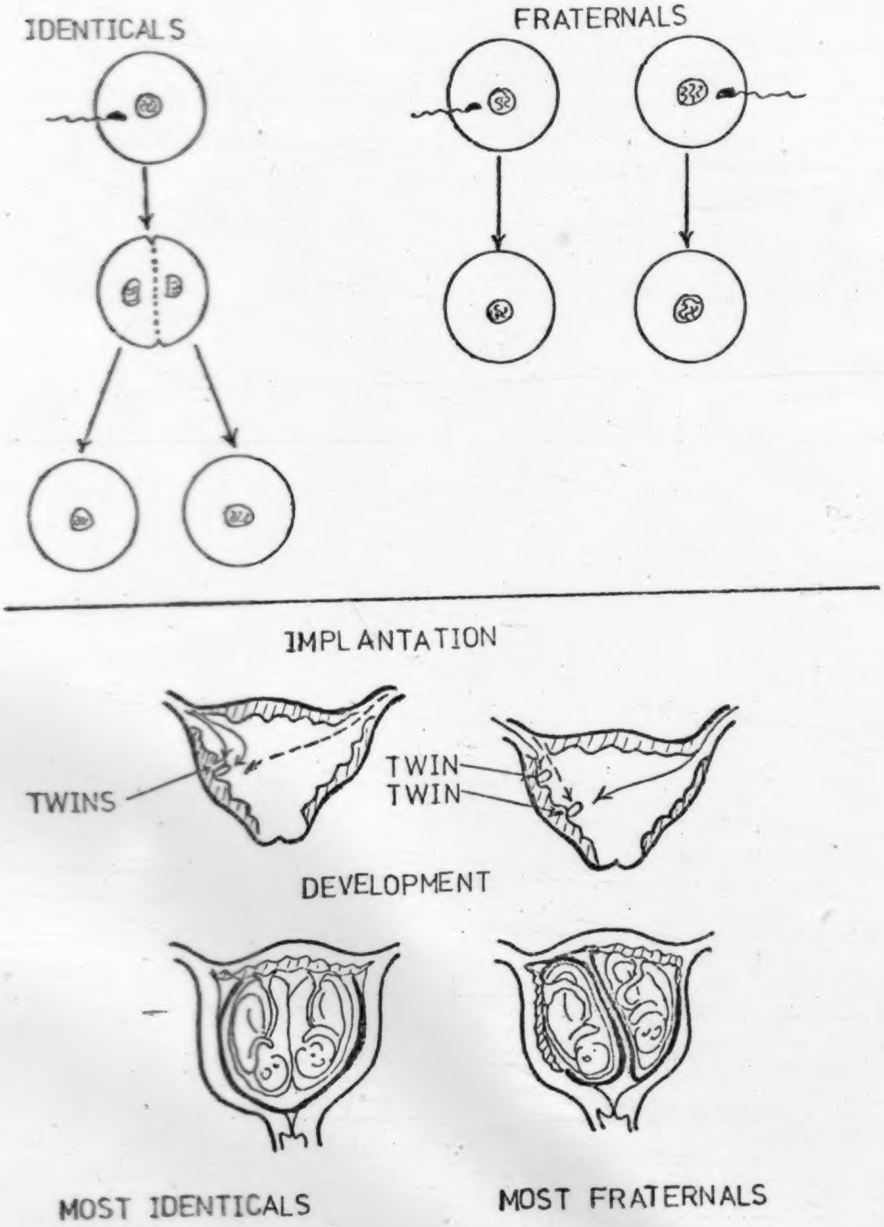
The combination of genetics and environment interacting makes it difficult to determine which traits are hereditary and which are not. However, the existence of twins who are identical in all their genes enables the investigator to focus on the difference in developmental traits and to infer non-hereditary effects. Shields (1962) stated, "The very fact the (identical) twins differ, sometimes extensively, is of itself evidence of non-genetic effects." (p. 156) The non-genetic effects would also exhibit themselves in the language development differences between co-twins in an identical twin pair.

Development in Twins

The formation of production of identical twins is somewhat different from that of fraternal twins. The formation or production of twins has been diagrammed in Figure II-A. The initial step in the process of twin production occurs when the egg is released. If two eggs are released simultaneously the chances of production of fraternal twins is increased. Identical twins always begin as a single egg which after fertilization divides to begin two identical offspring. The fraternal pair usually are produced from two separate eggs being fertilized by separate spermatazoan. Fraternal twins may, however,

FIGURE II-A

PRODUCTION OF TWINS


IDENTICALS
FRATERNALS
IMPLANTATION
TWINS
TWIN
TWIN
DEVELOPMENT
MOST IDENTICALS
MOST FRATERNALS

come from one single egg which divides before fertilization and each part is subsequently fertilized by separate sperm.

After the initial fertilization of the egg or eggs the implantation may take place close together, as is the case with most identical twins, creating one common or fused placenta. The egg(s) may implant separately and develop separate placentas, separate amnions and chorions as generally occurs with fraternal twins. Identical twins occasionally develop with separate implantations, but usually develop with a common placenta.

If improper implantation occurs,the result is mortality for one or both of the foetuses. More often, however, twins show signs of competition for nourishment and sustenance in the womb. This normally is exhibited by a difference in weight or health. The crowding of two or more foetuses in a womb,sized for the development of one baby,does create problems. The most noticeable effect of crowding is birth difficulty. Guttmacher and Schuyler (1972) revealed that 47 percent of twin births were head first births, 37 percent had one twin head first and other twin breech, 9 percent were both breech births, and the remaining 7 percent were either both crossways or one crossways at the time of birth.

Twins tend to be classified as premature more often than are singletons,but a prematurity classification refers to birth weight of less than 2500 grams (5.5 lbs.) as opposed to "term" babies whose weight exceeds the 2500 gram marker. Anderson (1956) reported that of 800 twin births, 58.6 percent were premature. Koch (1966) stated that 52 to 58 percent of twin births were premature. The occurrences of prematurity in the population was 6 to 7 percent (Koch, 1966).

Brown, Stafford and Vandenberg (1967) reported that in twin populations, birth weight and order of birth are independent of each other. This is contradictory to the work of Koch (1966) and Shields (1962) who indicated that in approximately two-thirds of the births the twin born first was the heavier, had a lower IQ and was judged to be the dominant co-twin prior to school age.

The childhood developmental milestones of crawling, walking, self-feeding, dressing, and toilet-training were superficially observed in the studies done by Koch (1966) and Shields (1962). Both studies indicated from responses to questionaires completed by the twins studied that the twin who was slightly heavier at birth tended to be slightly more advanced in completing the developmental steps.

Identical twins tend to parallel each other in physical development to a greater extent than do fraternal twins. Koch (1966), and Shields (1962), supported by Husen (1959), all stated there was a high degree of similarity and "likeness" in identical co-twins at age five. Identical twins are most alike, at the age for school commencement, in looks and physical characteristics. Fraternal twins of the same sex differ to a fairly large degree and opposite sex twins tend to be as different as two siblings in a family.

Intelligence and School Achievement

A great deal of research has investigated the intelligence of twins with consistency being the major characteristic of the findings. The studies of Lauterbach (1926), McCarthy (1930), Day (1932), Davis (1937), Anastasi (1958), Husen (1959), Koch (1966) all report that twins from an "unselected" sample will reveal an average IQ score lower than singletons. The literature indicates that singletons in a normal population have a slightly higher IQ mean than do opposite sex fraternal twins, followed closely by same sex fraternal and female identical twins. Male identical twins tend to follow the other groups in IQ score.

Anastasi (1958) and Koch (1966) agree that the probable link of slightly lower mean IQ's to twins stems to some degree, from the difference in uterine environment. The instance of prematurity and birth difficulty may account for some restriction in mental development.

According to Jones (1954), siblings tend to exhibit a slight degree of resemblance in the Intelligence Quotients, the correlation between the scores being .50 to .60. The correlations between the score for fraternal twins is between .60 and .70 while identical twins produce IQ scores which correlate from .76 to .92. Table II. 1 presents the correlations of IQ scores between groups. The table is a summary of the results of the research of Burt (1943), Day (1932), Husen (1959), Jones (1954), Newman et al. (1937) and Shields (1962).

TABLE II. 1

Correlations of IQ Scores

Between Groups

	Jones (1954)	Day (1932)	Newman et al. (1937)	Burt (1943)	Husen (1959)	Shields (1962)
Identical		.92	.88 .76*	.86	.90	.76 .77*
Fraternal		.61	.63	.54	.70	.51
Siblings	.50-.60					

*Identical twins reared apart.

Husen (1959) explained the correlations in his study by stating:

> It appears probable that "The tendency towards uniformity" in the MZ pairs is considerably higher than in DZ pairs. The more loaded with experience an achievement is, the more pronounced the similarity within the MZ pairs, while the similarity within the DX pairs does not increase to a corresponding degree, because their common experience is less. (p. 55)

Shields (1962) asserted a similar position:

> The DZ pairs confirmed the importance of genetical factors for intelligence. An analysis of the presumptive causes of differences in those MZ pairs which differed most, suggests that physical, social and psychological factors can be responsible, often in combination, for variation in intelligenee. (p. 64)

Day (1932) using her own data, reworked the results from earlier twin studies and determined that identical twins have IQ's

6.9 points above fraternal twins. Newman, Freeman and Holzinger (1937) indicated an IQ factor of 5.5 points for the identical twins over fraternal twins. Day (1932) identified the Intelligence Quotient of identical twins at 99.7 whereas Newman et al. (1937) determined the IQ of identical twins to be 101.6. Day (1932) and Koch (1966) concur that the IQ for twins as a group is about 4.4 IQ points below singletons in a normal population.

In the large scale studies of Swedish twins, Husen (1959, 1963) reported that twins did less well in achievement tests in reading, writing and arithmetic than did singletons in the study. The small sample used in the Cossitt (1966) study indicated that there was no significant difference between the reading performance of twins in grade one and a grade one population. Newman, Freeman, and Holzinger (1937) reported that the environment of education has an effect on the school achievement ability. The findings revealed a slight advantage in achievement for identical twins reared apart, in favor of the co-twin reared in a "better" environment. The twin reared in the poorer environment lagged slightly behind the co-twin in school achievement, weight and intelligence. Newman et al. (1937) concluded that:

> owing to the excess of the postnatal environment factor in separated as compared with unseparated twins, significant mean twin differences occur in the case of weight, intelligence and scholastic achievement. (p. 345)

Scheinfeld (1973) explained the achievement and intelligence results somewhat differently. He stated that one group of twins was fully up to the IQ and achievement of singletons, while the other group was behind. The group which was considerably behind was comprised of children who had been premature at birth or had an impairment. He wrote, "It is these, mainly, who lower the average for all twins."(p.139). Scheinfeld (1973) suggested that the percentage of mentally deficient twins in institutions was higher than the percentage of normal population would warrant. The reasons given for this occurrence was the higher number of irregularities at birth; these included prenatal deficiencies, accidents of birth, Down's Syndrome incidence and cretinism.

In summary, twins as a general population achieve slightly less well on IQ and scholastic achievement tests than do non twin children. Identical twins" IQ scores are fairly close to scores of the general population and fraternal twins' IQ scores are several points behind those of identical twins. There is a very high correlation in IQ scores for identical twins while the IQ scores for fraternal twins are correlated less highly than for identical twins.

Personality and Dominance

The number of studies that discuss personality in twins is quite limited. Newman,Freeman and Holzinger (1937), Husen (1959), Shields (1962), Koch (1966), and Scheinfeld (1973) reported the tendency for identical twins raised together to reflect a closeness of personality greater than do fraternal twins or siblings. These reported studies stated that personality closeness was reflected by the similarity of the observable degree to which the twins exhibited gregariousness, exhibitionism, talkativeness and involvement with adults in social situations. All studies indicated that twins , because of their uniqueness, were often put on show by parents. This exposure to public scrutiny often created a feeling of being on public display within the twin pair. In all studies the twins were beyond preschool age and all had received schooling.

Koch (1966) and Scheinfeld (1973) both suggested that in twins, school age and older, the socialization measures and talkativeness measures of the second child born of the twin pair showed a slight positive correlation. The measures were obtained by a series of questions asked of each member of a twin pair in various social situations. The responses indicating aggressiveness in social situations were perceived as an indication of personality dominance. The responses further indicated that identical twins tend to have a less clearcut dominance- subordination relationship than do fraternal twins, but parents would invariably state which member of the identical twin pair was dominant. Brown, Stafford and Vandenberg (1967) maintained that the only measure of dominance in a twin study would be " which twin was successful in getting his way when there was a contest for toys" (p.11063). Brown et al., Shields (1962) and Koch (1966) all revealed that identical twins particularly, seem to shift their relative dominance-submission position at about the time the twins enter school. The dominance was observed as aggression or verbal extroversion of one member of a pair in their attempt to lead or control the situation in which the twins were involved. Husen(1959) stated that, as a rule, one of the co-twins in the identical twin pair was the ambassador who answered when the pair was addressed. Husen, asserted that the ambassador twin generally had better control of the language. When the findings of Husen (1959), regarding better language control of the ambassador, are presented along with the findings of Koch(1966) and Shields (1962),regarding dominance shift occurring at school age, at least two questions are raised. Did the ambassador twin ,the dominant twin, always have better language control? Did the ambassador with the better language control shift to that dominant position at school age from a subordinate position?

The research into personality and temperament carried out by Thomas,Chess and Birch (1970) was a longitudinal study, designed to examine the behavioral temperament of infants. The infants were followed through childhood to adulthood. The researchers determined that children show distinct individuality in temperament in the first few weeks of life and these characteristics of temperament persist in most children over the years. In the study by Thomas et al. (1963) " a high level of interscorer reliability was objectively demonstrated by the fact that characterizations were identical in 90 percent of the 198 comparisons made " (p.52). They further state that :

> The assessment of reliability and validity permitted us to conclude that the data of the parent interview were a valid reflection of the child's behavior and that the methods of scoring were reliable and not significantly influenced either by scorer attitude or halo effect (p.55).

Over time interaction with the envirorment works on shaping the temperament into personality patterns.

The temperamental rating scale analysis of the twins characteristically produced a different subtest profile for each co-twin. Perhaps the relationship that develops prior to formal schooling is interpreted as a form of dominance-submission. Buss and Plomin (1975) support this idea in the following statement:

> Aggression can be explained in terms of three temperaments; activity, emotionality (mood) and impulsivity (adaptivity and approachability) . Each of the three temperaments contributes to aggressiveness in a way that probably summates, so that a person high in activity emotionality and impulsivity is likely to be aggressive (p.198).

Montaque (1976) states that; " dominance aggression is evoked by a challenge to the rank or the desire for an object " (p.14).

Table II-2 presents the percent of cases in which Thomas et al (1963) found stability of temperament for the duration of the study.

TABLE II-2

Percent of Interperiod Stability by Category

Category of Temperament	Percent Stability
Activity	27.5
Rhythmicity	65.0
Adaptability	83.8
Approach	81.2
Threshold	41.2
Intensity	87.5
Mood	92.5
Distractibility	36.2
Persistence	65.0

From Thomas, Chess, Birch, Hertzig and Korn (1963, p. 67)
(Definitions of temperamental categories appear in appendix B)

Summary

The literature suggested that identical twins develop somewhat of a dominance subordination pattern between the pair members. The dominance-subordination roles were exchanged about school age and the child in the dominant position after school age exhibited better language control than did the co-twin. The physically dominant preschool child becomes the subordinate school age child as the child with greater language development becomes dominant.

LANGUAGE PERFORMANCE

Normal Language Development

The babbling of the infant indicates to an observer that the child is an active rather than a passive learner of language (Brown, 1973; Cazden, 1969; and Howe, 1975). The child must learn to construct some sense out of his experience and to place his verbal environment in an meaningful perspective before his attempts at language production become successful. Lenneberg (1967) drew attention to the regularity of the onset of speech. All children, he stated, appear to follow a constant order. Language begins with acquisition of the principles of categorization, and the first words tend to be classification words rather than objects. Nelson (1974) supported the language theory by stating that children categorize objects before they can label them. Authorities such as Nice (1925), McCarthy (1930), Weir (1963), Lewis (1963), Greenfield & Smith (1976) stated that one-word utterances make up the first stage of language acquisition. Language development then proceeds through the stage of two-word utterances which occurs between 18 months and two years. The studies of Braine (1963), Brown and Fraser (1963), Miller and Ervin (1964), Blount (1969), Bloom (1970), Bowerman (1973), and Greenfield and Smith (1976) investigated the nature of child language at various ages after the appearance of the two word utterance.

Brown and Fraser (1963) suggested that the child systematically reduced adult speech and that the two and three word utterances were produced because of the limited memory. The memory span would restrict the retention of more than two or three word utterances. O'Donnell (1974) summarized many of the early language acquisition studies. He supported the consensus that the first utterances of children are of the one-word variety, each word containing whole sentence meanings. The advent of two-word phrases illustrates a move towards grammatically complete sentences, apparently constructed by the rules of adult grammar" (p. 115). Cazden (1969) states,

> One of the most dramatic findings of studies of child language acquisition is that the stages they (children) pass through on their way to mature language, show striking similarities across children but equally striking deviations from the adult grammar. (p. 128)

Templin (1957) and Lee and Canter (1971) both concurred that by about three years of age at least 50 percent of children's utterances are grammatical. According to Francis (1975), by four years of age the basic syntax of the language has been mastered by the normal child.

After four years of age language growth continues (Loban, 1963 and O'Donnell, 1974) and the child further develops vocabulary and uses more complex syntactic structures in his language.

Measures of Language Development

The most frequently used method of measuring language development has been the unit of analysis or mean length of utterance. Several studies have looked at language development in terms of mean sentence length.

In a clinical study, Nice (1925) advocated the use of mean sentence length as a device for measuring linguistic development. The study involved several English speaking children, ranging in age from two years to ten years, some only at the one-word utterance stage.

Although "sentence" was not defined, it appears from examination of protocols that "sentence" was to include main clauses and their modifiers. The stimulus materials were not standardized, nor were the procedures or the overall number of samples analysed. Nice (1925) concluded that "average sentence length may well prove to be the most important single criterion for judging a child's progress in the attainment of adult language" (p. 378). Nice also found mean length of utterance increased with the children's age.

McCarthy (1930) began to place constraints and standardization on the definition mean length of response. She determined that a response had beginning and ending pauses or inflections at the beginning and at the end. Incomprehensible vocalizations were counted by syllable and comprehensible responses by word. The study examined language samples from one hundred children ranging in age from eighteen months to fifty four months. Fifty consecutive verbal responses were recorded by hand (i.e., without the aid of a tape recorder). The study concluded that "the mean length of response shows a steady increase with chronological age, which is most rapid between eighteen and forty two months" (p. 68). McCarthy also stated that the mental age and sex differences, in favor of females, affected the mean length of responses as did occupational groups of the parents.

In her study of language of twins, aged eighteen months to five years, Day(1932)used McCarthy's definition. The findings revealed that twins used somewhat shorter responses than did normal non twin children. Davis (1937) observed twins, siblings and singletons, aged five and one half to nine and one half years. She defined sentence length as remarks where "the child came to a complete stop, let the voice fall, ... giving interrogatory or exclamatory inflection, or indicating that he did not intend to complete the sentence" (p. 44). Davis's summary stated that the mean length of sentence increased with age slightly to advantage for females. Occupational groups affected length of sentence in favor of children from the upper groups. Twins were only slightly inferior to other children in the mean length of the sentences they used.

The combination of the research of Day (1932) and Davis (1937) produced results on the mean length of sentence of twins from 18 months to 9 years of age. These were the first studies dealing with the language performance of twins.

Templin (1957) analysed the mean length of utterance of children three years to eight years of age. She defined an utterance as a unit of speech determined by the subject's natural break in verbalization. The study confirmed that an increase from one age division to the next was consistent.

Length of phonological unit was introduced by Strickland (1962) in her study of 575 grade-school children. She established a definition for mean-sentence length as a phonological unit or " a unit of speech ending with a distant falling intonation which signals a terminal point" (p. 16). However,the study concluded that"length of phonological unit appeared in this study to be unsatisfactory as a measure of the maturity of language" (p. 60).

The length of the communication unit or C-unit used by Loban (1963) was defined as being composed of words acting as grammatically independent prediction. The C-unit is an independent clause with any of its modifiers. Loban reported that the number of C-units and the mean length of the C-unit all increased with age. The communication unit was further altered by Hunt (1965). Hunt defined the minimal terminable syntactic unit or T-unit as one main clause with all the subordinate clauses attached to it. In the study of written language samples, Hunt (1965) concluded that the T-unit was a more promising index of language maturity than previous measures. The T-unit was further used by O'Donnell, Griffin and Norris (1967), and applied to both the oral and written language of grade school children. The study by O'Donnell _et_ _al_ stated:

> This study, in fact, appears to justify an intuitive reluctance to regard a gross word count very seriously as a measure of language mastery in school age children. (p. 97)

Figure II-B summarizes the definitions of mean length of response as used in various studies.

In order to obtain a mean length of response the gross number of words was counted in each response and the sum was divided by the number of responses. Table II-4 summarizes the mean length of responses reported in six different studies.

The effect of changing definitions for mean length of response had produced various means for each age or grade level. For example. mean length of utterance for grade one's (6 year olds) reported by four researchers, was as follows:

Templin(1957)	6.6	Loban (1963)	6.05
Strickland (1962)	10.87	O'Donnell (1967)	7.97

FIGURE II.B
Mean Length of Response -Defined
In Various Studies

Study	Definition or Interpretation
Nice, 1925	"sentence"used but not defined-appears to be the main clause and modifier
McCarthy, 1930	"response" marked from preceding and succeeding remarks by pauses incomprehensible utterances counted by syllable, comprehensible by word.
Davis, 1937	"sentence" 1) a falling inflection (or rising interrogative inflection), 2)a complete stop in speech, 3) pause between segments
Templin, 1957	"utterance" a unit of speech determined by the subject's natural break in verbalization(falling intonation or stop in speech)
Strickland, 1962	"phonological unit" unit of speech ending with a distinct falling intonation which signals a terminal point
Loban,1963	"communication unit" C-unit ,the grammatical, independent clause with any of its modifiers
Hunt, 1965	"T-unit" one main clause with all the subordinate clauses attached to it

The definitions of mean length of response used by McCarthy (1930) Davis (1937), Templin (1957), and Strickland (1962) are all similar in nature and intent. They focus on breaks in speech and inflection changes. The T-Unit and C-Unit of Hunt (1965) and Loban (1963) emphasise the clause and its modifiers. For the purpose of this study the definition of Templin (1957) was chosen, because it is the most current dealing with simple structures which would be used by a young child.

TABLE II. 3

Mean Length of Response By Age/Grade

Age	Grade	McCarthy (1930)	Templin (1957)	Strickland (1962)	Loban (1963)	O'Donnell (1967)	Davis (1937)
3		3.4	4.1				
3.5		4.3	4.7				
4		4.4	5.4				
4.5		4.6	5.4				
5	K		5.7		4.81	7.07	4.6
6	1		6.6	10.87	6.05	7.97	
7	2		7.3		6.57	8.33	5.3
8	3		7.6		6.65	8.73	
9.	4			12.67	7.70		6.5
10	5				7.89	8.90	
11	6			14.04	8.37		
12	7					9.80	

Templin p. 79, Strickland p. 26, Loban p. 28, O'Donnell et al p. 45, McCarthy p. 52, Davis p. 49.

The major problem of development studies is to find an index for complexity of utterance which is general enough to apply to all remarks yet reliable enough to reflect increasing competence in language. Linquists, such as Menyuk (1969) and Chomsky (1971), used the rules of transformational grammar as markers for language development. The studies, however, did not state if difficulty of transformation or order of acquisition was consistent. Francis (1975) stated that"the questions of difficulty and order of acquisition is open to empirical investigation" (p. 107).

Lee and Canter (1971) introduced a method of combining the sentence complexity with the grammatical aspects of speech to evaluate a child's language (speech) performance by means of a Developmental Sentence Score (DSS). DSS is a measure which evaluates a child's performance, his use of grammatical rules in spontaneous speech, and measures the child's grammar against adult standard English. The method of analysis employs the use of traditional grammar somewhat modified in classification and nomenclature. The DSS uses eight grammatical categories placed in a developmental order with weighted values assigned. The categories: 1) indefinite pronouns, 2) personal pronouns, 3) primary verbs, 4) secondary verbs, 5) negatives, 6) conjunctions, 7) interrogatives reversals, and 8) why questions were established in a clinical setting and norms were developed using two studies,one of 160 children, (3-0 to 6-11 years) Lee and Cantor (1971) and one of 200 preschool children, Koegsknecht(1974). The Lee & Cantor (1971) study sights that the interscorer reliability was 98.1 %.

Lee and Cantor (1971) define a sentence as a group of words having noun and verb in subject-predicate relationship. Imperatives were classed as complete sentences.

Tyack (1972) criticized the Lee and Canter Developmental Sentence Score technique because for school age children it was not linguistically oriented enough to analyse all the details in the language. Tyack felt that Lee and Canter overlooked valuable information in their definition of a sentence. Lee and Canter (1971) admitted that all linguistic characteristics were not scored separately but were accounted for in part by an extra point being given if the use of adverbials and adjectivals as well as articles, plurals, phrases and word order etc. were correct. These grammatical features, Lee and Canter felt, were not significant for preschool children in showing development in language but were perhaps more appropriate for measures with school age children.

The Developmental Sentence Score does not account for increased adverbial and adjectival use because adverbials and adjectivals appear not to be plentiful in language of preschool children (Lee and Canter, 1971). O'Donnell et al (1967) indicated that in school age children,

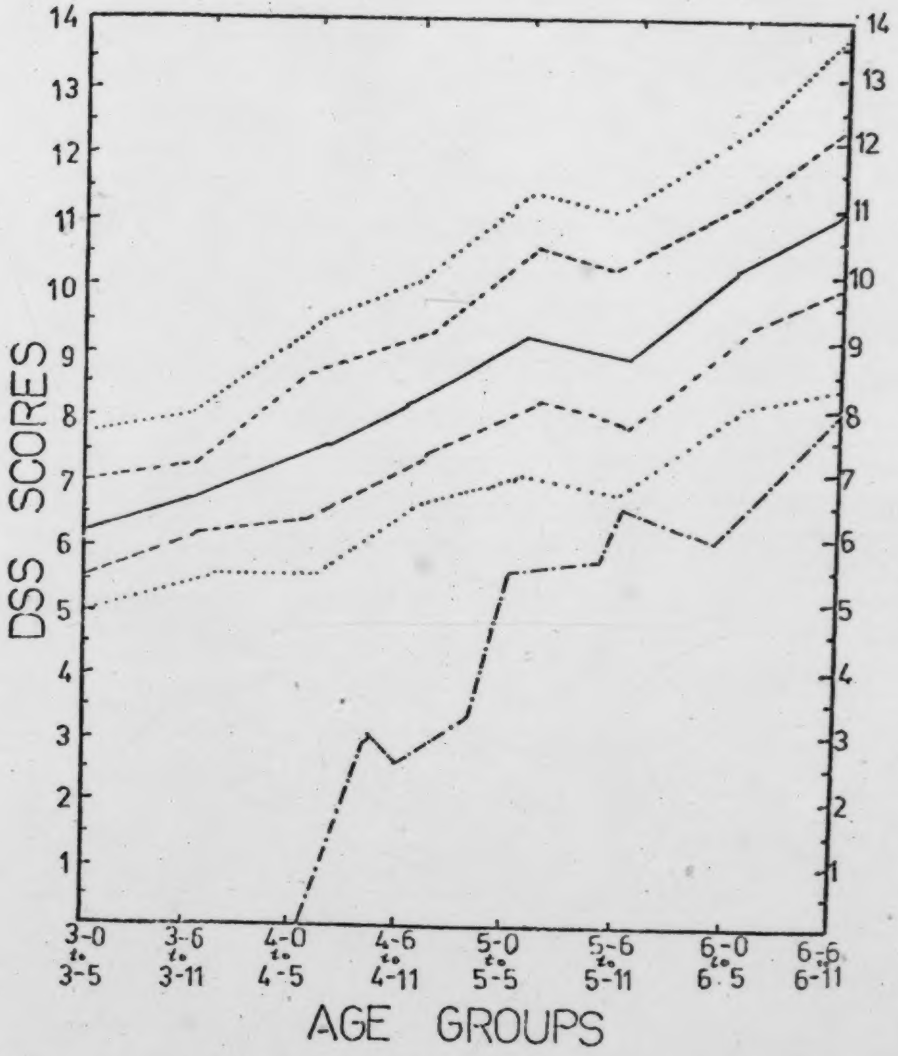
> Greatest overall increase and most frequent significant increments from grade level to adjacent grade level were found in the use of adverbials. (p. 90)

Figure II-C presents the percentile ranges for Developmental Sentence scores of the 160 children in the Lee and Canter (1971) study. The gradual upward trend is illustrated by the percentile ranges in the figure. The bottom dotted line represents the bottom 10th percentile while the lowest line in the figure illustrates the scores for a language impaired child.

FIGURE II-C

PERCENTILE DEVELOPMENTAL SENTENCE SCORES

FOR NORMAL CHILDREN



········ 90th & 10th percentiles

- - - - 75th & 25th percentiles

—— 50th percentile

-·-·- Language impaired child

(Lee & Canter 1971, p. 336)

The study conducted by Trantham and Pedersen (1976) compared Developmental Sentence Score and mean length of sentence. They indicated that the mean sentence length was slightly more revealing prior to approximately 28 months but after the mean sentence length reached 4.0 the Developmental Sentence Score became a more revealing measure of language development.

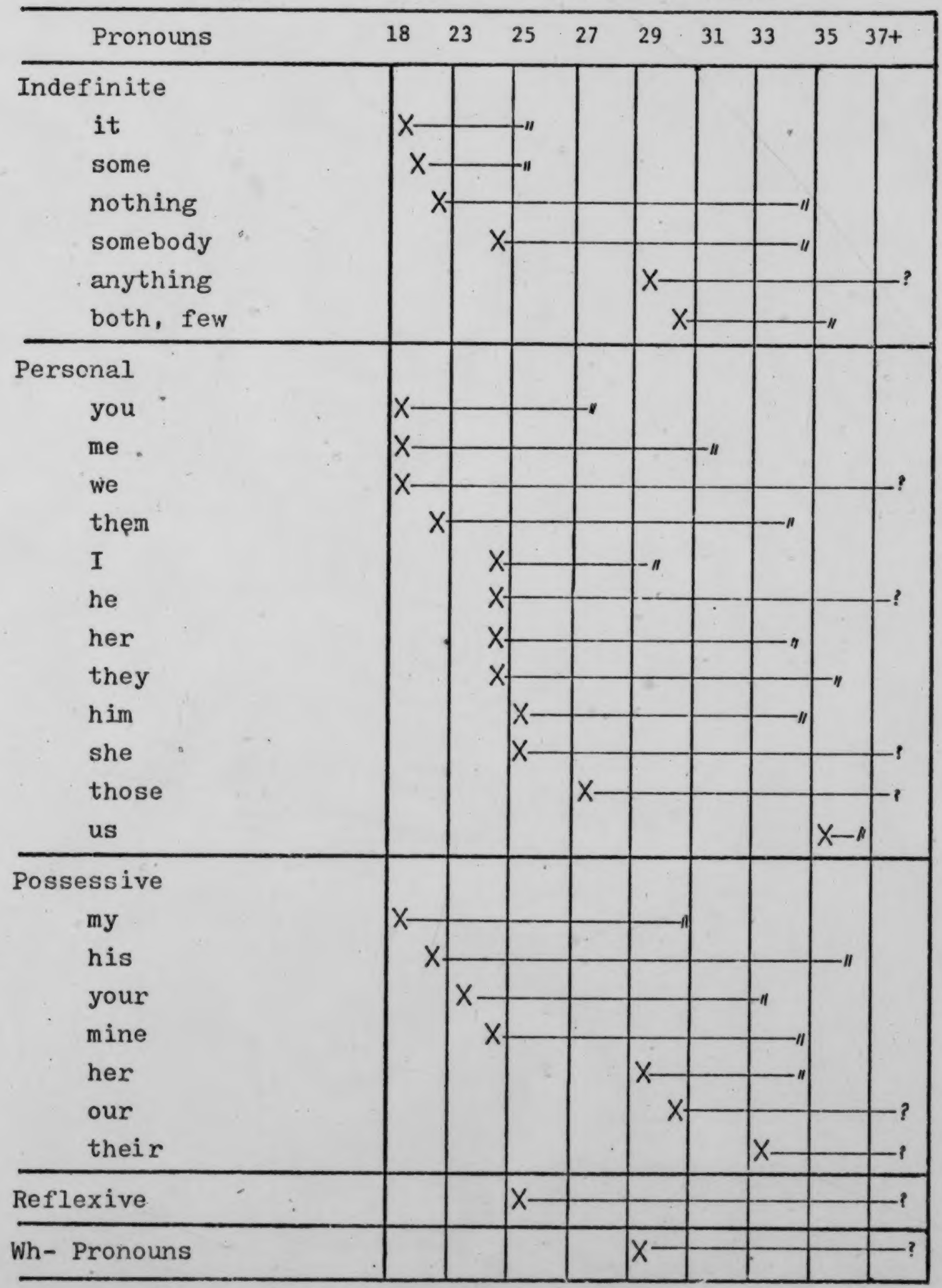
Trantham and Pedersen (1976) asserted that utterance length was affected by situation variables such as illness and anxiety but the complexity as measured by the Developmental Sentence Scores was not affected. These effects on mean sentence length make mean length of utterance a less reliable measure of language development than the Developmental Sentence Score.

A number of studies have looked at Maze usage in attempts to infer some developmental evidence. The results of the studies of Loban (1963), O'Donnell et al (1967) contradict the results of Templin (1957) and Anderson (1972). Analysis of sentence length and maze usage appeared to reveal a relationship of inverse direction. Loban and O'Donnell et al indicated the directionality in maze usage was difficult to determine.

The emergence of pronouns in the language of children, is somewhat developmental (Trantham & Pedersen, 1976). The pronouns are incorporated into the language over a period of time. The emergence of each of the pronouns by age range as shown in Figure II D represents a developmental step in language acquisition. Trantham and Pedersen (1976) state that some of the indefinite pronouns, personal pronouns and possessive pronouns begin to emerge before others. The pronouns "it","you","me","we", and"my" all tend to emerge fairly early while pronouns such as

FIGURE II-D

Emergence of Pronouns in Normal Children



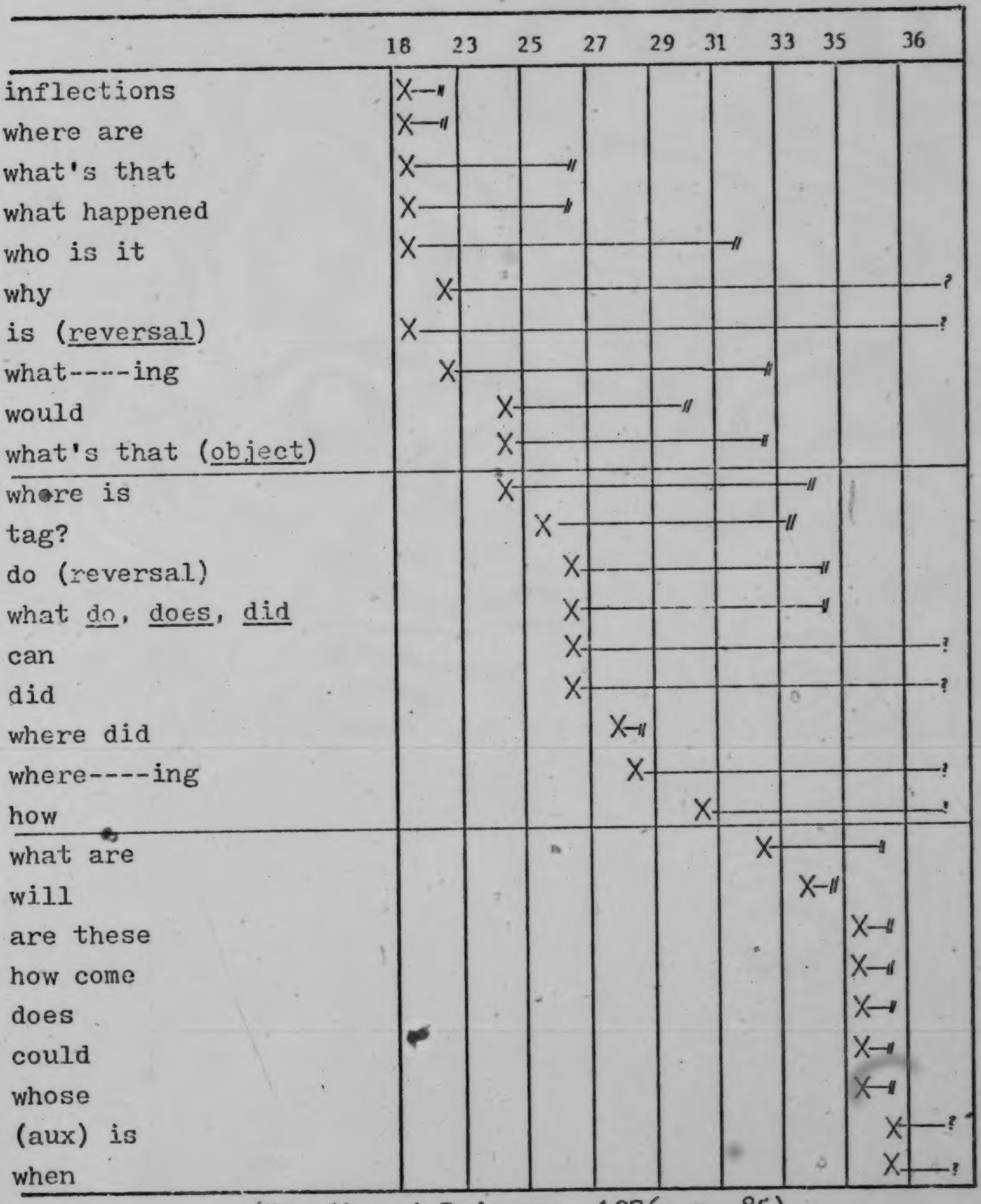
(Trantham and Pedersen, 1976, p. 47)

"somebody", "I", "he", "her", "they", "mine", and "she", normally emerge shortly thereafter. The last pronouns to emerge are: "anything", "us", "our", "their" and the wh pronouns, The correct use of a pronoun form is an indication of that form emerging in the child's language. If a child erroneously uses a pronoun form it is an indication that the child is attempting to include the correct pronoun form in his language. The initial attempts at the use of new forms are often erroneous. Trantham and Pedersen (1976) state that pronouns and the erroneous attempts at using new pronoun forms can be employed to assist in determining a developmental language level for a child.

Trantham and Pedersen (1976) also developed an emergence pattern for the use of interrogative forms, They report that the normal English speaking child acquires twenty eight different questioning or interrogative forms. The initial method of questioning, the placing of interrogative intonations on simple sentences appears as for example, "We go in the car?" Menyuk and Bernholtz (1969) and Brown (1963) also confirmed that questioning intonations, although the last intonation patterns to develop, become the first interrogatives, appearing at approximately 18 to 22 months. The interrogative forms that appear next, as shown in Figure II-E, Emergence of Interrogatives in Normal Children, are of the "what's that," "where are", "what happened", and "who is it" type. The "Why" form comes shortly thereafter. The interrogative

FIGURE II-E

Emergence of Interrogatives in Normal Children



(Trantham & Pedersen, 1976, p. 85)

forms of "are these", "how come", "does", "could", "whose" and"when", appear at approximately 35-36 months in normal children. Trantham and Pedersen (1976) stated that the use of a correct form of an interrogative indicates a child has acquired the use of that form in his language while the child acquiring a new interrogative pattern usually uses that pattern erroneously before using it correctly.

Language Sampling

Language sampling techniques have varied and changed as researchers have attempted to find accurate and appropriate methods of obtaining language from children. McCarthy (1930) observed each child individually in his own home or place very familiar to the child. A portion of McCarthy's samples were obtained having the child alone with the observer but with the child's parent's also in the room. McCarthy presented each subject with two picture books, one of nursery rhymes the other of animals. Along with the books several toys, a telephone, a ball, toy autos, a toy that squeaked, a music box and a toy mouse, were presented. The children who failed to produce language were asked a question in order to elicit responses.

Day (1932), insofar as was possible, replicated McCarthy's use of toys. Day observed and recorded the language samples in the twins' homes. Some of the samples were obtained one twin at a time with the observer and some were obtained with both twins together. Day (1932), McCarthy (1930), and Davis (1937) all recorded the language manually without mechanical aid.

Davis (1937) observed the twins used in her study in the schools and each subject, alone with the observer, was presented with toys and books. The toys were mainly cowboys, Indians and covered wagons. The picture books used consisted of a book about ships, a book about school and a book about animals.

The studies of Piaget (1926) and Luria & Yudovich (1959) obtained language samples from children playing together in relatively natural play situations. The spontaneous language generated was usually between children in the play situation with occasional instances of conversation with adults.

Lee and Canter (1971), Cazden (1968), Loban (1963) and Brown (1968) all recorded the language samples generated first by using a tape recorder and later transcribing the protocols.

Lee and Canter (1971) requested each child to play with a series of toys and talk about the toys. The children were also asked to tell about the pictures in some books and finally to tell the story of Goldilocks and The Three Bears from a picture book. The observers attempted not to direct the conversation but rather let the child produce his own language.

The use of spontaneous language play situations as well as elicited language with an adult were methods frequently employed for obtaining oral language samples from children.

The development of techniques for assessing the self-concepts of preschoolers have progressed since Thomas (1967) introduced a testing procedure involving the presentation of a polaroid picture of the subject to himself. The subject was asked questions about himself while viewing his own picture. The child's responses were then used to establish a self concept profile of that child. Therrien (1969) suggested that the use of video tapes would perhaps be effective in helping to elicit responses to self concept questions. Yamamoto (1972) stated that having a child see himself and identify himself would help to determine if the child perceived himself as others saw him or if the child had a distorted view of himself. Lewis (1977) used a mirror in front of infants to determine if the children had a concept of self and reported that the mirror was an effective method of determining self.

Itis highly probable that the children used a great number of pronouns to describe the self.

Twins Language Performance

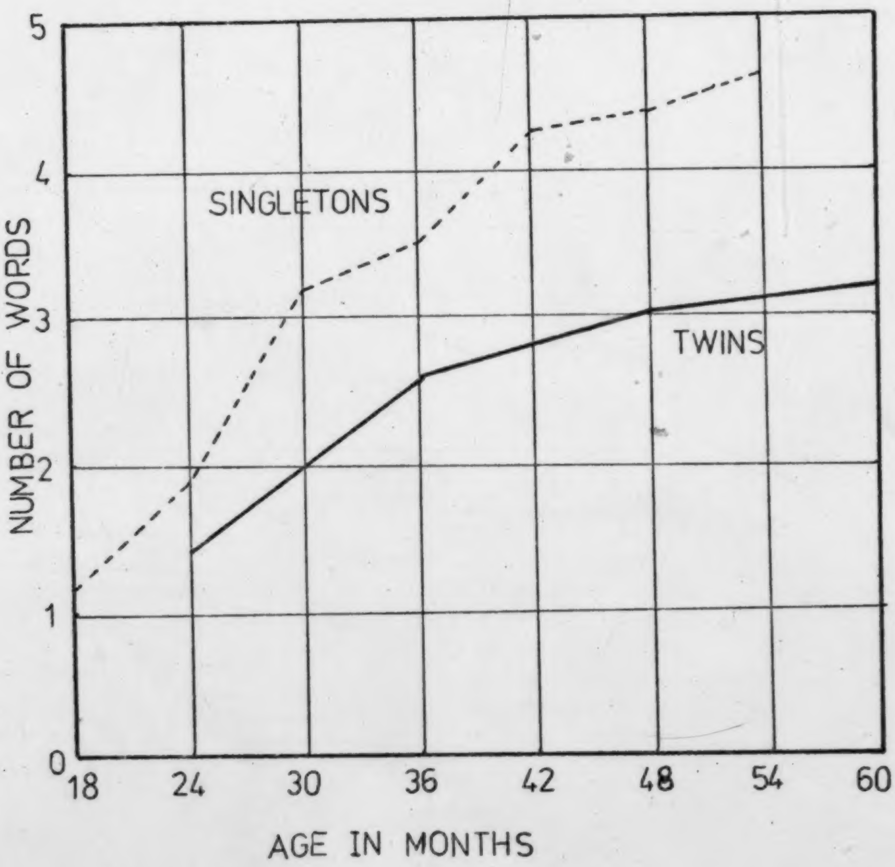
When a twin situation is observed, it is evident that the closeness of the children provides companionship and a source of communication not available to singletons. The surface assumption of language acquisition implies that language is learned by imitation and a set of children imitating each other might indeed develop alternate forms of the language. The studies of language development in twins tends to support this assumption.

The study by Day (1932) of 80 pairs of twins, ages two to five years, compared twins to the singletons studied by McCarthy (1930). A similiar format was followed by Day. Both McCarthy and Day presented their subjects with an array of stimuli, using toys and books and, as the children explored the stimuli a language sample was elicited from each subject. Fifty consecutive verbal responses were manually recorded. The analysis of the language sample in the Day (1932) study examined four major areas; 1) mean length of response, 2) word analysis by parts of speech, 3) functional analysis and grammatical construction of sentences. Day reported that language development in twins showed evidence of retardation in all areas of investigation. The developmental lag as exhibited by the twins was reported to have increased with age. Figure II-F illustrates the increasing divergence between the length of response as uttered by singletons and those uttered by twins as a group. Day (1932) stated that twins of five years of age were lagging by almost two years behind singleton peers.

FIGURE II-F

MEAN LENGTH OF UTTERANCE

(Day, 1932 p. 185)



Day (1932) asserted that twins used fewer words than singleton children, particularly with the use of adjectives, pronouns, verbs, nouns, and conjunctions. Twins did, however, use a greater percentage of interjections than did their singleton counterparts. Again, the developmental lag attested to by Day was approximately two years by the time the children reached five years of age.

The results of Day's analysis of the grammatical nature of sentences indicated that twins were somewhat delayed in grammar use. Twins did, however, show a rapid gain in sentence complexity between four and five years but not to the extent that singletons progressed.

Day (1932) revealed that occupational class had an effect on the development of twins. The effect seemed to compound the language lag for twins in lower occupational groups. She reported that twins in the homes of lower occupational groups were far behind their counterparts in the upper occupational groups.

Davis (1937) studied twins, singleton children with siblings and only children from five years to ten years of age. Davis duplicated the design of both McCarthy (1930) and Day (1932), in both presentation of stimulus and in analysis technique. Davis (1937) used 97 only children, 173 single children with siblings and 83 pairs of twins.

Davis (1937) asserted that only children were superior to children with siblings who in turn were superior to twins in every phase of linguistic skill. Twins of the ages 5 to 9 years were especially retarded in the perfection of articulation. Also, of significance in the Davis study was the statement that occupational group affected twins language performances. Davis (1937) revealed that upper occupational group twins recovered most of the developmental lag in language by 9½ years but the lower occupational group twins made very little progress.

Davis did not report on any differences between fraternal twins and identical twins but rather placed all twins together in one large group. Koch (1966) identified fraternal twins and identical twins in her study of 90 pairs of twins, ages five to seven years. Koch analysed language samples which had been recorded as the children told stories aided by picture stimuli. The language samples were analysed in terms of phonetic, morphological and syntactic aspects. Koch concluded that in terms of language development fraternal females were significantly superior to identical male and female pairs who in turn were superior to fraternal males. Koch (1966) further stated that "twins taken as a whole did not perform conspicuously below their singleton controls" (p. 67). The difference in results between Koch (1966) and those of Davis (1937) and Day (1932) brings to the fore a question whether or not there is a language lag in the language development of twins.

Conway and Lytton (1975), in their study of 8 pairs of identical twins, 4 pairs of fraternal twins and 24 singletons ages 32-33 months, found no significant group differences in language development. The language development of twins was reported to have shown a slight directional lag. The causes of the language lag were attested to be from paranatal or prenatal stress and, more importantly, from too little adult interaction and too much sibling interaction. The lack of parental interaction was emphasized by Lytton (1977) as the causal factor for delay in language skills of twins.

The lack of interaction with parents combined with too much sibling interaction was highly exemplified in the study by Luria and Yudovich (1959). The case study of one set of five year old identical twins reported that the language of the twins was very much like that of children two years younger. The researchers stated that the parents of the children seldom interacted with the twins and left the twins to play and converse on their own. The twins were observed to have been slightly different in terms of the number of words used as well as the percentage of incomprehensible utterances. These investigators ovserved that the twins' speech was tied to the activity in which the twins were engaged. Conclusions from the study suggested that in early speech, understanding of a situation context assisted in holding words together in meaningful patterns. The twins in the Luria and Yudovich(1959) study were separated, resulting in reduction of much of the communication between the members of the twin pair. The children were gradually forced to adopt language behavior closer to that of adults and the other children in the group. Luria and Yudovich concluded that linguistic learning was accompanied by improvement in cognitive activity.

One member of the twin pair was given special speech teaching tasks. Luria and Yudovich (1959) illustrated the effect of placing a necessity for speech communication on the acquisition of a language system.

The twins no longer in a situation of communicating only with each other, rapidly were affected by an environmental need to communicate. Significant also was the speed with which the twins acquired language. The effects of language interaction with adults were noticed in three months. Luria and Yudovich did not indicate if a dominance-subordination situation existed between the twins, or if a shift might not have taken place after the twins entered the playschool classroom.

Lenneberg (1967) summarized a number of twin studies and stated that fraternal twins are much more prone to differences in language development than are identical twins. He defined language development as "the age at which the first words appear, words are joined into phrases, and grammatical mistakes become minimal" (p. 253). Lenneberg contended that identical twins are more alike than are fraternal twins so language development will be more closely related for identical twins. Differences in language development between identical co-twins was not explained by Lenneberg.

Munsinger and Douglass (1976), in their study of 37 pairs of identical twins, 37 pairs of fraternal twins and 29 pairs of siblings, attempted to determine the degree to which differences in the syntactic abilities of twins were genetic. These investigators indicated that being a twin or sharing a common environment was not the major cause of language similarity. The study reported that identical twin pairs were very similar to each other in language skills while the language skills of fraternal twins were no more similar to each other than were the language skills of twins. Differences that did occur in the language development between identical co-twins were not elaborated nor described by Munsinger and Douglass (1976).

Summary

The literature suggests that the language development of twins is somewhat inferior to that of singletons. The language deficiency is greater for lower occupational groups which compounds the effect on language performance in twins. The research also indicates that identical twins are closer in language development than are either fraternal twin groups or singletons.

Statements regarding the developmental lag in language implicate the social situation in which twins find themselves. According to research reports, verbal communication used for need satisfaction as well as for social satisfaction is less of a necessity for twins than it is for singletons. Findings also show that the twin situation provides each member of the twin pair with a co-twin whose language could be modeled. Because twins tend to reinforce the language of the co-twin, inaccurate representations of the language are modeled and reinforced.

The literature does not make clear the differences in language performance that occur between co-twins in identical twin pairs. Lastly, the effect of dominance-subordination roles on the language performance of identical twins appears not to have been questioned.

CHAPTER III

DESIGN OF THE STUDY

The purpose of this chapter is to present the design of the study. This chapter includes a discussion of the sampling procedures, methods used for gathering data, the instruments employed as well as the treatment of the collected data.

I. DESCRIPTION OF THE SAMPLE

Selection

The sample was selected from the twin population of the Greater Edmonton Metropolitan area. Initial contact of the twins was made through the Edmonton Twin and Triplet Club. The Club supplied a list of 27 pairs of the available twins, ranging in age from 2 years 6 months to 6 years 0 months, both identical and fraternal pairs. From the list ten Monozygotic pairs were identified and further categorized according to the language of the mother tongue. Seven pairs of four-year-old twins were retained in the sample all having English as their sole language. One pair was deleted due to illness, leaving six pairs. The final simple used in the study consisted of three sets of female identical twins and three sets of male identical twins.

The parents of the twins were contacted to obtain consent for participation in the study and to determine convenient times for observation.

Determination of Zygosity

The classification of the twins according to zygosity was based on confirmation from three sources. First, the Edmonton Twin and Triplet Club indicated the zygosity of each twin pair. The Club records had established the zygosity of each twin pair at the time of birth, using information obtained from the hospitals and attending doctors. Secondly, a parental statement based on medical acknowledgement of monozygosity reaffirmed the initial information. In addition, the examiner observed the twins for hereditary traits.

The examiner's observation and the parental classification were in complete agreement for all the twin pairs. The classifications of the parents and examiner, concurred completely with the Edmonton Twin and Triplet Club classification.

According to the parents, and from examiner observation, none of the children suffered from sensory handicaps nor physical handicaps. Although one child was suspected by the parents of having a slight tongue thrust, the child's speech did not seem to be noticeably affected.

II. PROCEDURES FOR DATA GATHERING

Setting

The parents of each twin pair were contacted by telephone in order to set a convenient time for observation which did not conflict with meals or rest requirements. Three of the twin pairs were observed in the morning and three pairs were observed in the early afternoon commencing at 1:30 p.m. Each session, including observation and parental interview, required from one and three quarter hours to two and one quarter hours. All data were collected the first week of May, 1977.

The children were all observed in their homes. The examiner began each session by talking to the parents, while the twins played nearby, to allow time for the children to become familiar with the examiner in their home. An oral explanation of the purpose of the study was given to the parent(s) before any data gathering began. An explanation of the recording procedure was given to both the twins and parents.

Age

At the time of observation the mean chronological age of the twins was 49.6 months with a range from 46 months to 54 months. For these twins, the mean age for commencement of speech was 16.6 months, with a range from 14 months to 20 months. Table 3.1 shows the distribution of twin pairs according to sex, age in months, and age at which the pairs began talking.

TABLE III. 1

Distribution of Twin Pairs According to Sex, Chronological Age, Age at Which Pair Began Talking

Pair	Sex	Talking Age in Months	Chronological Age in Months
M_1 (A&B)	Male	20	46
M_2(A&B)	Male	18	52
M_3(A&B)	Male	16	54
F_1(A&B)	Female	18	50
F_2(A&B)	Female	14	49
F_3(A&B)	Female	14	47
Group Mean		16.6	49.6

Additional Data

At the time of observation all the twins were members of two parent families. Two pairs of twins had older siblings, two pairs had younger siblings and two pairs had no siblings other than the co-twin.

A cassette tape recorder was employed to record all the children's verbal utterances. Hand written notes were used to record the parental responses during the parental interview. During the language sampling sessions the examiner recorded notes in order to identify each speaker as well as to identify which stimulus objects engaged the children's attention.

As the twins were identical, the examiner realized it would be extremely difficult to differentiate between the voices of identical twins when transcribing the protocols. To cope with the problem the examiner made carefully written transcripts during each session.

Parental Interview

The purpose of the parental interview was to obtain some relevant facts about each twin pair. During the interview the examiner secured the names and birth dates of each pair as well as the age at which each twin pair had begun to talk. Due to the identical appearance of the children in each pair it was necessary to determine definite identities for the examiner. This was facilitated by the wearing of visibly differing articles of clothing by each co-twin. The parents were asked to indicate how often stories were told or read to the children.

The format of the interview as well as the outline of the questions asked in the study are located in Appendix A.

As the parents were given two copies of the Temperament Quality Inventory (see Appendix B)to complete, the following directions were given:

1) I would like you to put the child's name on top and complete one sheet for each child.
2) Please circle the appropriate word on the rating scale that best describes each child.

The parents were asked if they wished the examiner to read each item and record the parental response. This, it was hoped, would eliminate any embarrassment which could have been caused if any parent was illiterate.

The parents were questioned regarding any perceived dominance in the twin pair. This information was obtained at the termination of the session in order to avoid bias in examiner observation of twin dominance.

Survey Instrument

The behavioural profile of each child was measured using the instrument designed by Thomas, Chess and Birch for their study of *The Origin of Personality* (1970).

The instrument (see Appendix B) lists and defines the following nine temperamental qualities: activity level, rhythmicity, distractibility, adaptability, attention span-persistence, intensity of reaction, threshold of responsiveness, quality of mood and the approach-withdrawal quality.

Each of the qualities is measured on a scale such as positive-variable (positive or negative)-negative, intense-variable(intense or low) low, high-low. The clusters of temperamental attributes determine the type of temperament from "easy children" characterized by positive mood, regularity of bodily functions, low reaction intensity through "slow to warm up" to "difficult children" characterized by irregularity of bodily functions, negative mood, withdrawal from stimuli, intense reactions and slow adaptability.

The parents of the twin pairs were requested to complete one copy of the temperamental quality inventory for each co-twin. The parents were asked to state any dominance perceived in the twins in terms of aggression, language and personality.

Language Tasks

For the purpose of generating oral language samples each pair of twins was presented with four major tasks. The four tasks were adapted from those used by previous researchers and were referred to as: 1) Mirror Task, 2) McCarthy and Day Task, 3) Twin with Adult Task, and 4) Story Task. The order of presentation of the tasks were kept constant.

1) Mirror Task.

The twins were asked by the examiner to take him to the largest mirror in the house, either the bathroom or dressing mirror. The twins were then positioned on either side of the examiner facing the mirror. The examiner would point to the mirror images of the twins and ask the twins several questions. The twins were asked: 1) to identify each body part as the examiner pointed to it and 2) to identify whose body part was being indicated. The following questions were asked of the twins:

1) Can you,___(twin's name), tell me what this is?
(reflection of his/her hand)

2) Can you,___(co-twin's name), tell me what this is?
(reflection of co-twin's foot)

3) Can you,___,tell me what this is?
(reflections of arms, chest, stomach, back etc.)

4) What am I pointing to,______(twin's name)?

5) What am I pointing to __(co-twin's name)?
(reflections of twin's leg)

6) ___ (twin's name), whose arm is this?
7) ___ (co-twin's name), whose hand is this?

The language generated was tape recorded.

2) McCarthy and Day Task

The twins were presented with a cardboard box of items which they could explore. They were told they could play with the things contained in the box and tell each other about what was inside. The items in the box used as language stimuli were:

1) a toy telephone (multicolored)
2) two cars (one red, one yellow)
3) a toy horse
4) a rabbit with squeaker
5) a music box record player and records
6) a plastic ball (for indoor use)
7) a zoo animal book
8) a book of nursery rhymes
9) 4 sheets of paper and two pencils

The examiner was nearby in order to prompt the children if language had to be elicited. The language generated was tape recorded for transcription later.Color PlateA, located in the Appendix, is provided in order to illustrate as closely as possible the original stimuli used in this study.

3) Twin with Adult Task

For the purpose of this task each child sat beside the examiner, removed from the co-twins hearing. Each twin in turn was asked about the contents of the box. The subject was to discuss or tell about an item that was contained in the box of stimulus materials. Each twin was asked:

1) ___ (twin's name), what did you like best from the box of things I brought?

2) Could you tell me about the (item)?

3) Why did you like it?

4) What is it for? or How does it work?

5) Tell me about the other things in the box.

6) Can you, ___ (twin's name), tell me what colors are on the ____ (item)?

4) Story Task

The Story Task in this study was composed of two smaller subtasks. The first subtask consisted of a series of questions regarding the child's own story background. One twin at a time was asked:

1) Does your mom/dad ever read or tell you stories?

2) Do you have any books with stories in them?

3) Can you tell me a story: Please tell me a story.

The second subtask was centered around the telling or retelling of the story of "Goldilocks and The Three Bears". Each subject was asked:

1) Do you know the story of Goldilocks and The Three Bears? Can you please tell me that story.

2) Look at this book ___ (twin's name). Tell me the story from the pictures in this book.

The child was asked to tell the story of "Goldilocks and The Three Bears" using the picture book stimulus in a book version bearing the same title pictures in plate B. The verbal responses were tape recorded for later transcription.

III TREATMENT OF THE DATA

The tape recordings of the oral language samples were transcribed into an accurate verbatum written transcript of the observation. The examiner notes, which were produced during the observation sessions, were of assistance in identifying the speaker and for identifying the items which engaged the attention of each subject.

The written protocols were validated by a judge who compared the transcripts with the original tape recordings. All protocols were determined to be accurate. All language samples were viewed objectively and descriptive similarities and differences were recorded.

Analysis of The Data

1) Speech Sampling

The language samples generated from the McCarthy and Day Task, the Twin and Adult Task and the Story Telling Task were analysed using the Lee and Canter (1971) procedure for Developmental Sentence Scoring. The Developmental Sentence Scoring chart is located in Appendix C.

The corpus of sentences used for analysis consisted of fifty complete, different, intelligible non-echololic sentences. The sentences were deemed to be complete if they have a noun and verb in subject and predicate relationship. The imperatives were counted as sentences. Each sentence was included only once but echololic utterances were excluded as they are repetitive rather than spontaneous sentences. The utterance for the Developmental Sentence score, like the T-unit, contains one main clause with all the subordinate clauses attached to it.

The utterances for analysis were composed of 40 consecutive sentences from the middle of the McCarthy and Day Task, five consecutive sentences from the middle of the Twin with Adult Task and five consecutive sentences from the middle of the Story Telling Task. These proportions were computed by taking the total number of utterances for each subject and determining the percentage of utterances used in each task.

The format was:

1) $\frac{\text{McCarthy and Day utterances}}{\text{Total Utterances}} \times 100$

2) $\frac{\text{Twin with Adult utterances}}{\text{Total Utterances}} \times 100$

3) $\frac{\text{Story Telling utterances}}{\text{Total Utterances}} \times 100$

The percentages were 80% McCarthy and Day Task utterances, 10% each from the Twin with Adult Task and the Story Telling Task.

The fifty sentence speech sample was scored according to the Developmental Sentence Score chart (Lee and Canter, 1971) and the mean score per sentence derived. The mean score was called the Developmental Sentence Score. Inter-scorer agreement between the investigator and the judges was calculated on the Arrington formula (1930) reported by Feifel and Lorge (1950) and applied by Nixon (1975). The overall percentages of agreement for the DSS revealed a 98% agreement between the investigator and the two judges, one a graduate student in English and the other a lecturer in Language Arts. A sample scoring appears in

2) Mean Length of Utterance

The corpus of sentences used for the calculation of mean length of utterance were the same fifty sentences used for the Developmental Sentence Scores. The mean length of utterance for each child was established by counting the words in the entire corpus of fifty sentences used for the Developmental Sentence Scores. The mean length of utterance for each child was established by counting the words in the entire corpus of fifty sentences, then dividing the result by fifty to obtain a mean length of utterance (M.L.U.).

$$\frac{\text{Total words for Fifty Utterances}}{\text{Fifty Utterances}} = \text{M.L.U.}$$

3) Interrogative Forms

The entire protocol of each subject was used in the analysis of interrogative forms used. The developmental scale proposed by Trantham and Pedersen (1976) was utilized in the analysis of the interrogatives. Each instance or occurrence of an interrogative form was charted and a gross count method was used to establish the number of different interrogative forms used by each subject.

4) Pronouns and Possessives

The entire protocol for each subject was used in the analysis of the pronoun and possessive pronouns used by each subject in the study. The developmental scale proposed by Trantham and Pedersen (1976) was utilized in the analysis of the pronouns used by the twins. The instance or occurrence of each pronoun and possessive pronoun was charted and a descriptive analysis was carried out.

5) Maze Usage

The number of mazes used in the entire language protocol of each child was established and a percentage of mazes per utterance was determined. The total count of mazes used was divided by the number of utterances in order to establish the percentage.

i.e.

$$\frac{\text{Total Number of Mazes}}{\text{Number of Utterances}} \times 100$$

Statistical Analysis

The numerical values calculated for Developmental Sentence Score, mean length of utterance, number of interrogatives used and the maze percentage were subjected to statistical measures testing. The score for each dominant twin was matched with the similiar score for the subordinate co-twin.

All data were subjected to an ANOVA 12 computer program. The program, developed by the Division of Research at the University of Alberta, performs t -tests on the data to establish significance of differences of means observed. Because the more powerful tests for dependent samples might tend to over exaggerate minute trends, the t -test for small independent samples was chosen. The use of more stringent tests might be overly cautious. Downie and Heath (1970) state : " The (researcher) who uses the formula for uncorrelated data when he actually has correlated data(may be) applying an unnecessarily stringent test to his data" (p.177). However, the use of a small sample perhaps warrants the caution.

IV PILOT STUDY

Prior to the initiation of the main study a pre-study was conducted using one pair of identical male twins age five years three months. The study was conducted in the fall of 1976 at a time when the twins had been in Kindergarten only two months. The twins had been separated in Kindergarten.

The purpose of the study was:

- To observe the language performance of identical twins.
- To analyse the differences, if any, between the language development of the two children.
- To observe if a dominance-subordination position had an effect on language.
- To observe the childrens' reaction to the tasks.

The use of Kindergarten age children in the main study was decided against because of the separation that might have taken place in school. Besides, the number of available four year old identical twins was greater than was the number of five year old identical twins.

V SUMMARY

This study was designed to determine what effect dominance-subordination roles have on language performance of identical twins. Chapter III began with an outline of the procedures and the selection of the subject. This was followed by an explanation of the zygosity of the twins. The setting of the observation as well as the survey instrument were explained before the data collection section explored the parental interview and the language sampling tasks. The analysis of the data, both descriptive and statistical was presented followed by an outline of the Pilot Study.

CHAPTER IV

FINDINGS OF THE STUDY

The purpose of this chapter is to present the results of the study. The chapter is divided into three sections. The first section discusses the determination of dominance of the twins sampled in this study. Section two presents the quantitative results of the study as well as description of the language samples. The second section also presents the statistical results where applicable. The third section presents some additional observations which were made during the course of ths study.

I. Determination of Dominance

The twin sample consisted of six pairs of identical four year old twins: three pairs were male and the other three pairs were female. During the observation sessions the examiner watched for acts of aggression which might be signs of dominance. By observing each pair the examiner was able to determine which child was successful in obtaining the play objects by a physical act. The criteria for determining physically aggressive acts were: proximal intimidation, snatching and grabbing, hitting and stiking, pushing and shoving. The child in each pair identified as using double the co-twin's aggressive acts to obtain play objects during the observation was classified as the dominant child. The child identified as dominant was assigned the letter A, the other member of each twin pair was identified by the letter B. The actual count of aggressive acts appears in Appendix A-2. In the following protocol examples the aggressive child is labelled A.

Each member of the twin pair labelled (A&B) was exploring the language stimulus materials. M1A was playing with the record player while M1B was playing with the toy telephone. (In order to assist the reader, the fictitious names Tom and Bill have been substituted for M1A (dominant) and M1B (subordinate) respectively)

Tom: I'm play my record.

Bill: Hello Hello, ready on telephone
something, something gum
no some gun.
Bye This Bill gain for Tom
He needs some help

Tom: What you want Bill?
I'm I'm puttin my record player and
I'm gonna dance
(gets up to dance to music)

Bill: Ya bye (hangs up phone and begins to reach for record player)
(Tom picks up a stick and hits Bill)

Tom: Sorry

Tom, the twin labelled M1A, maintains possession of the toy by use of an aggresive or physical act. In the following example, the twin pair labelled F2 (A&B) was playing with the stimulus material. F2A begins this example with the record player while F2B has the nursery rhyme book. (Again, F2B and F2A are replaced with the fictitious names of Sue and Jane.)

Sue: Lookit Jane.

Jane: Doesn't go. Doesn't go again.

Sue: Lookit that one little girl with a hat on like that.
Ya thats a funny hat.
I know its a punkin.

Jane: They're rocking aren't they?
(Jane moves closer to Sue)

Sue: Look at that old mommy-man.

Jane: Can I see? (Jane is beside Sue)

Sue: Nope Nope you can't see no more of it. Look at that. What is this? (Jane takes the book and Sue offers no resistance)

Jane: Look! The Baby!

Both examples of physically aggressive behaviour were the type of behaviour from which the examiner drew inferences about which member of each twin pair was dominant.

At the termination of the observation sessions in the homes, the parents were asked to identify, for the examiner, which child the parents believed was dominant. In all cases except one, twin pair M2, the parents identified the dominant child, as the child labelled A by the examiner. For the twin pair M2 the parents were uncertain about any dominance but selected the child labelled B by the examiner.

The ratings from the completed Temperamental Quality Inventory were analysed and dominance was determined on those ratings. The statement of dominance determined by the ratings were compared to the statements of dominance made by the parents and the examiner.For The ratings of all pairs shown in Table IV-1, agreement in determination of dominance were consistent, except for twin pair M2 (A&B). The examiner, the parents and the Temperamental Inventory all established child A as the dominant child, the exception being twin pair M2 where the examiner picked Child A, the parents picked Child B and the inventory selected neither. The three methods for determination of dominance identified five dominant children out of six pairs of identical twins.

While it cannot be said why one child was not identified as dominant, in twin pair M2, it is noteworthy that these children had switched role positions on several occasions. The parents stated that these children were often left on their own to play for long periods of time.

TABLE IV - 1

Determination of Twin Dominance
by Agreement

Twin Pair	Selection of Dominance Examiner	Parent	Temperamental Inventory
M1 (A&B	A	A	A
M2 (A&B)	A	B	neither
M3 (A&B)	A	A	A
F1 (A&B)	A	A	A
F2 (A&B)	A	A	A
F3 (A&B)	A	A	A

Analysis of Temperamental Quality Inventory

The Temperamental Quality Inventory was analysed in order to determine the patterns of the ratings of the temperamental qualities. The analysis of the ratings revealed consistency in the patterns for the members of the two groups of twins dominant and subordinate. The patterns of the rating of the nine temperamental qualities for each group are presented in Table IV-2. The clear division into dominant and subordinate groups was consistent for all pairs except twin

twin pair, M2 (A&B) where neither twin followed any pattern but rather had more identical ratings than the other pairs.

The data from which Table IV-2was compiled appears in appendix B-2.

TABLE IV - 2

Temperamental Quality Patterns for Dominance

Quality	A-Dominant	B-Subordinate
1) Activity level	high	moderate
2) Rhythmicity	variable	regular
3) Approach, withdraw	approach	variable
4) Adaptability	adaptive	variable
5) Intensity of reaction	no pattern	no pattern
6) Threshold of responsiveness	high	high
7) Quality of mood	positive	variable
8) Distractibility	variable	variable
9) Attention span	variable	variable

The characteristic features in the rating patterns of the five dominant children were: high activity level, variable rhythmicity, approachability, adaptability, and a positive quality of mode. The characteristic features in the rating patterns of the subordinate child were: moderate activity level, regular rhythmicity, variable approachability and adaptability and a variable quality of mood. The five children perceived as dominant were more highly active when eating, sleeping, playing etc. whereas the subordinate counterpart had a more moderate activity level for similar motor behaviours. The subordinate child had a more regular rhythmicity or cyclicality of behavior such as toilet habits meal times, sleep needs than did the dominant child.

The dominant child was rated as variable in regularity of behavior. The dominant child was approachable and adaptive with regards to new stimuli and new situations. The subordinate child varied somewhat in his ability to adapt to situations or when he was approached by new stimuli. The quality of mood for the dominant children was more positive, happier, more pleasant and friendlier compared with the six subordinate children's variable moods. With regards to the intensity of reaction, distractability and attention span, no difference was observed between the dominant child and the subordinate child in the twin pairs.

Summary

The findings of Section I, Determination of Dominance, are summarized as follows:

1) The examiner determined which child was dominant in six pairs by observing the aggressive behavior of the twins. The aggressive or dominant child was labelled A in each twin pair. The less aggressive or subordinate child was labelled B.

2) The parents of the twins stated which child they believed was the dominant child. In all pairs except twin pair M2, the parents indicate child A. The parents of twin pair M2 indicated child B.

3) The ratings from the Temperamental Quality Inventory wereused to augment identification of dominance. The dominant child had,a high activity level, a variable rhythmicity, an adaptive adaptability level, a positive quality of mood and was approachable. The pattern of the subordinate child was, a moderate activity level, regular rhythmicity,

variable approachability and adaptability and a variable quality of mood.

The use of the Temperamental Quality Inventory in this study may provide some support for its use as an instrument for assisting in the selection of dominance in twin pairs.

4) Five dominant children out of six pairs of twins were determined using the three selection methods of examiner selection, parental selection and temperament rating.

II. QUANTITATIVE RESULTS

The verbal utterances, made by the children while doing the four language tasks, when transcribed provided 2136 utterances. This represents a mean of 178 utterances for each subject. This exceeds the number of utterances Lee and Canter (1971) suggest are necessary in order to obtain sufficient for sentence analysis. Lee and Canter state that a corpus of 100 responses is necessary in order to obtain 50 sentences for analysis. The mean of 178 utterances collected in this study far exceed the number of utterances Day (1932) collected from the twins in her study. Day (1932) collected 7836 utterances from 80 pairs of twins which represents a mean of 48.9 utterances per subject.

The entire language sample collected from each child was analysed in terms of the number of mazes, the developmental patterns of interrogatives and pronouns.. More intense analyses were carried out on fifty sentences taken from each child's language sample. The fifty sentences were analysed according to the Lee and Canter (1971) Developmental Sentence scoring chart(Appendix C). A Developmental Sentence Score (DSS) was calculated for each child. The same fifty sentences used for the DSS were also analysed to determine mean length of utterance for each subject.

Developmental Sentence Score

Scoring DSS

The language samples were scored using Developmental Sentence scores and scores were calculated for each child.

The words in the sentences were examined individually and assigned a value in agreement with the Developmental score determined by the chart. (Appendix C)

Sample	Total
3 2 1 1) They're monkeys!	6
1 1 0 0 2) Tongue that's hes tongue.	2
0 3) More pages!	0
2 1 0 0 4) She's a this.	3
2 5 1 1 5 1 5) He won't let me play.	15
	26

$$\frac{\text{Sum of scores}}{\text{Number of Sentences}} \qquad \frac{26}{5} = 5.2$$

The DSS for this sample would be 5.2

Sentence 1) They're monkeys!

Received a score of 6, comprised of a 3 for the use of the plural personal pronoun they, a 2 for the copula are and a 1 for the sentence being complete with no errors.

Sentence 2) Tongue, that's hes tongue.

Received a score of 2, comprised of 1 for the use of the indefinite pronoun that, a 1 for the copula is or 's. The sentence received a 0 for incorrect use of the personal pronoun his and so does not get the extra sentence point.

Sentence 3) More pages!

Received a score of zero.

Sentence 4) She's a this.

Received a score of 3, comprised of a 2 for use of the personal pronoun she, a 1 for copula is or 's and a 0 for the incorrect use of indefinite pronoun this.

Sentence 5) He won't let me play.

Received a score of 15, comprised of a 2 for the use of the personal pronoun He, a 5 for the negative won't, a 1 for the main verb let, a 1 for the personal pronoun me, a 2 for the secondary verb (infinitive complement) play and a 1 bonus sentence point for completion of the sentence.

The sum of the sentence scores (6, 2, 0, 3, 15 = 26) is divided by the number of sentences (5) to determine the Developmental Sentence score of 5.2.

The Developmental Sentence scores as calculated appear in Table IV-3.

The results of the Developmental Sentence Scores show that in all cases except twin pair, M2, the subordinate child, B, had a DSS that was higher than the DSSof the dominant co-twin.

Comparison of DSS

TABLE IV - 3

Developmental Sentence Scores of Twins

	TWIN PAIR					
Twin	M1	M2*	M3	F1	F2	F3
Dominant A	5.10	4.24	4.3	3.52	6.02	6.02
Subordinate B	5.35	3.95	5.8	4.25	9.04	7.49

*No agreement in dominance.

· As the language sampling technique was replicated from Lee& cantor(1971)

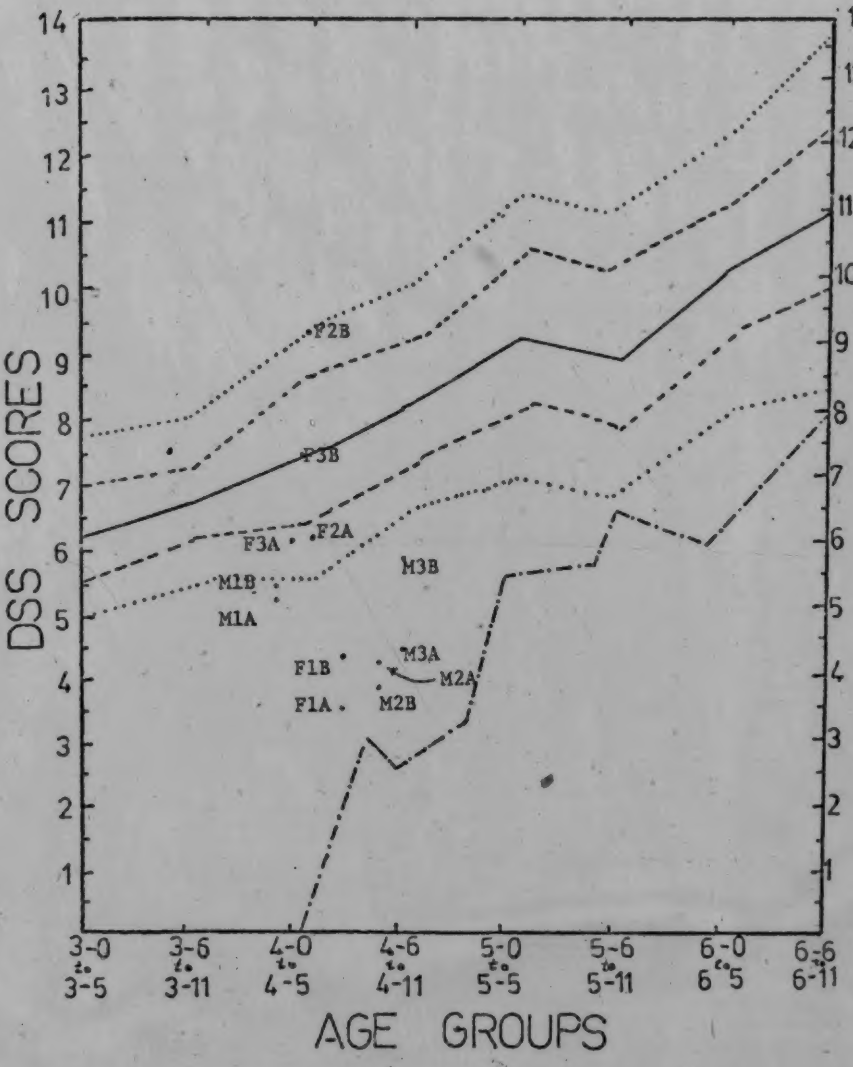
The Developmental Sentence Scores of the twins in this study were compared to the DSS of the subjects in the Lee and Canter (1971) study. The DSS of the twins in this study fall slightly below the range of DSS for a normal population determined by Lee and Canter (1971) and is illustrated in Figure IV-A.

The DSS of the twins labelled M1(A&B), M2(A&B), M3(A&B) and F1(A&B) fall below the 10th percentile scores for score distribution of normal language users. According to Lee and Canter (1971), " children falling below the 10th percentile are in need of clinical language assistance." The DSS of twins F3A and F2A are above the 10th percentile but below the 25th percentile lines. Twin F3B has a DSS which is considerably higher than the other children, placing her approximately at the 50th percentile. Twin F2B has a DSS above the 90th percentile level.

FIGURE IV-A

PERCENTILE DSS OF NORMAL CHILDREN

AND SIX PAIRS OF TWINS



……… 90th & 10th percentiles

----- 75th & 25th percentiles

—— 50th percentile

-·-·- Language impaired child

(Lee & Canter 1971, p. 336)

The DSS of the male twins M1(A&B),M2(A&B) and M3(A&B) places the males below the " normal language performance level " as ascertained by the DSS. Only one female pair of twins F1(A&B) is below the "normal level". The mean DSS for the males in this study is 4.78 which is significantly below the female DSS mean of 6.13. The male twins suffer a language lag which appears to be more severe than the lag for females. The twin pair M2(A&B) have the lowest DSS among the males and F1(A&B) have the lowest DSS among the females.

This study appears to be the first study to measure the language performance of identical twins in terms of Developmental Sentence Scores so no direct comparisons can be made between the twins in this study and the twins in any other study.

Dominance Effect on DSS

The Developmental Sentence Scores of the twin pairs exhibiting a definite dominance pattern, M1, M3, F1, F2 and F3, were subjected to a simple t-test to establish t-test values for the difference of the means of the scores of the dominant and subordinate groups. The results of the t-test, revealing that a significant difference was observed, is shown in Table IV-4.

TABLE IV-4

Developmental Sentence Scores
By Twin Group

Group	Mean	S.D.	t--value	D.f.	Prob.
Dominant A	4.992	.977			
Subordinate B	6.386	1.688	2.968	4	.041

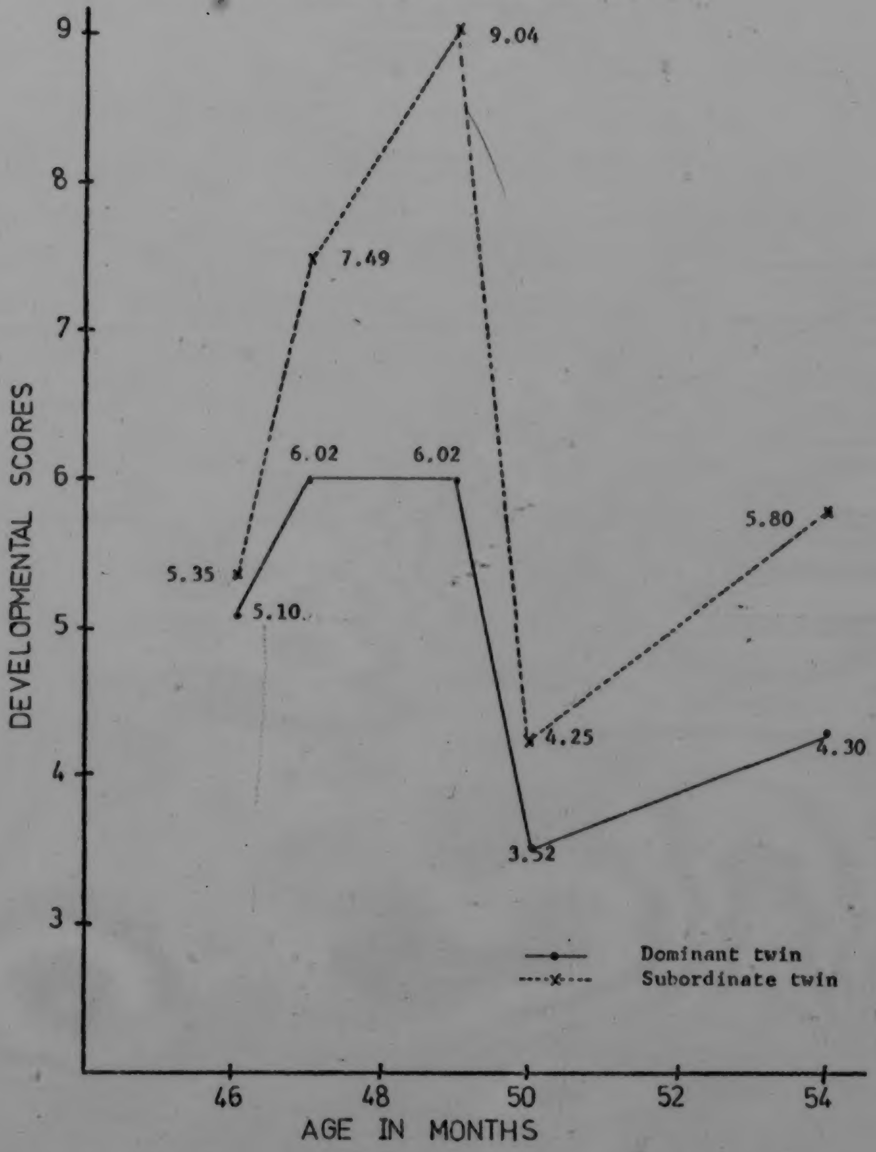
The significant difference between means provide evidence that the subordinate twin has the higher Developmental Sentence Score (6.386) whereas the dominant co-twin has a lower Developmental Sentence Score (4.992). The results , diagrammed in Figure IV-B, clearly show that for this sample of identical twin pairs, the child placed in the subordinate position exhibits better language performance as expressed by the Developmental Sentence Score than does the dominant co-twin.

It appears that the twin placed in the subordinate position may develop language skills in order to deal with his situation. The child who is more aggressive or dominant may be able to have his/her needs adequately satisfied by using his aggression as well as his verbal ability. The child in the subordinate position may not be able to rely on aggression to assist in the satisfaction of needs but may

FIGURE IV-B

DEVELOPMENTAL SENTENCE SCORE AND AGE IN MONTHS

FOR TWIN PAIRS SHOWING DOMINANCE



instead develop language in order to have those needs satisfied. However, it is not possible to establish which is causal or which, if anything, is the effect.

The following example of twins F2(A&B) illustrates the use of language on the part of F2B, rather than force or aggression for the satisfaction of needs or wants. An argument had occurred over the use of the record player contained in the stimulus materials array and currently F2A had possession. (A is the dominant female child and B is the subordinate co-twin.)

F2A: No! Don't put it on! I got to put the record on first.

F2B: Could I have it? Please? You're suppose to share it. You want to be my sister?

(F2B reaches to touch record player)

F2A: Don't! Stop it!
Don't!
Get your hands off it.

F2B: Mom I want that.
Can I have it mom?
I want that now.
Mom, aren't you watchin? (yes)
Can I have it now? (nods)
(F2B gets record player)

It appears from this example that F2B obtained the record player by the use of language rather than by physical aggression. The Developmental Sentence Score of Twin F2B was the highest of any of the children sampled.

Other Effects of DSS

The age at which each twin pair began to speak did not seem to have any measureable effect on the Developmental Sentence scores. The twin pairs that began to talk the earliest, 14 months, had the highest DSS. However, the pair that began to talk the latest,20 months, had the third highest DSS. Neither the age for commencement of speech nor the position in the family seemed to have any apparent effect on the DSS. The DSS of each twin, the position in the family and the age for speech commencement for each twin is shown in Table IV-5.

TABLE IV - 5

DSS, Number of Siblings and Age for Speech Commencement

Child	DSS	Siblings	Age for Speech in Months
M1A	5.10	0	20
M2A	4.24	0	18
M3A	4.3	1 older	16
F1A	3.52	2 younger	18
F2A	6.02	1 older	14
F3A	6.02	1 younger	14
M1B	5.35	0	20
M2B	3.95	0	18
M3B	5.8	1 older	16
F1B	4.25	2 younger	18
F2B	9.04	1 older	14
F3B	7.49	1 younger	14

Summary of Developmental Sentence Scores

The findings of the Developmental Sentence score analysis are summarized as follows:

1) In each pair exhibiting dominance, the DSS of the subordinate twin was higher than the DSS of the dominant co-twin. This difference was statistically significant at the .05 level of significance.

2) The DSS of the male twins were lower than the DSS of the female twins.

Mean Length of Utterance

The fifty sentences from each subject used for the calculation of Developmental Sentence Score were also used as the corpus of sentences from which the mean length of utterance was calculated. The mean length of response for each subject is shown in Table IV - 6

TABLE IV - 6

Mean Length of Utterance
for Twin Pair

		Mean Length of Utterance	
Pair	Age in Months	Dominant A	Subordinate B
M1	46	4.58	4.98*
M2	52	4.12(1)	4.32*
M3	54	3.88	4.50*
F1	50	4.10	3.72
F2	49	4.22	4.98*
F3	47	5.10	4.84

* indicates longer M.L.U. for subordinate co-twin.

(1) indicated no agreement on dominance.

Dominance Effect of M.L.U.

The mean length of utterance for the subordinate twin was slightly higher for M1B, M2B, M3B, and F2B than for their corresponding co-twin. The mean length of utterance for the twin pairs F1(A&B), and F2(A&B) were reversed and the M.L.U.for the dominant twins were higher than the M.L.U. of the subordinate co-twins. Davis (1937) reported that children who scored higher in shyness used longer sentences than did children who scored less in shyness. If shyness can be equated to subordinance then these results tend to be consistent with the findings of Davis(1937)

The mean length of utterances for each group was subject to a simple t-test to establish t-test values for the differences in the means of the two groups. The simple t -test revealed no significant difference between the mean length of utterance for the dominant (mean 4.33) and subordinate (mean 4.55) groups as is shown in Table IV - 7.

TABLE IV - 7
Mean Length of Utterance
by Twin Group

Group	Mean	Std Dev.	t value	D.f.	Prob.
Dominant A	4.33	.401			
Subordinate B	4.55	.447	1.18	5	.291

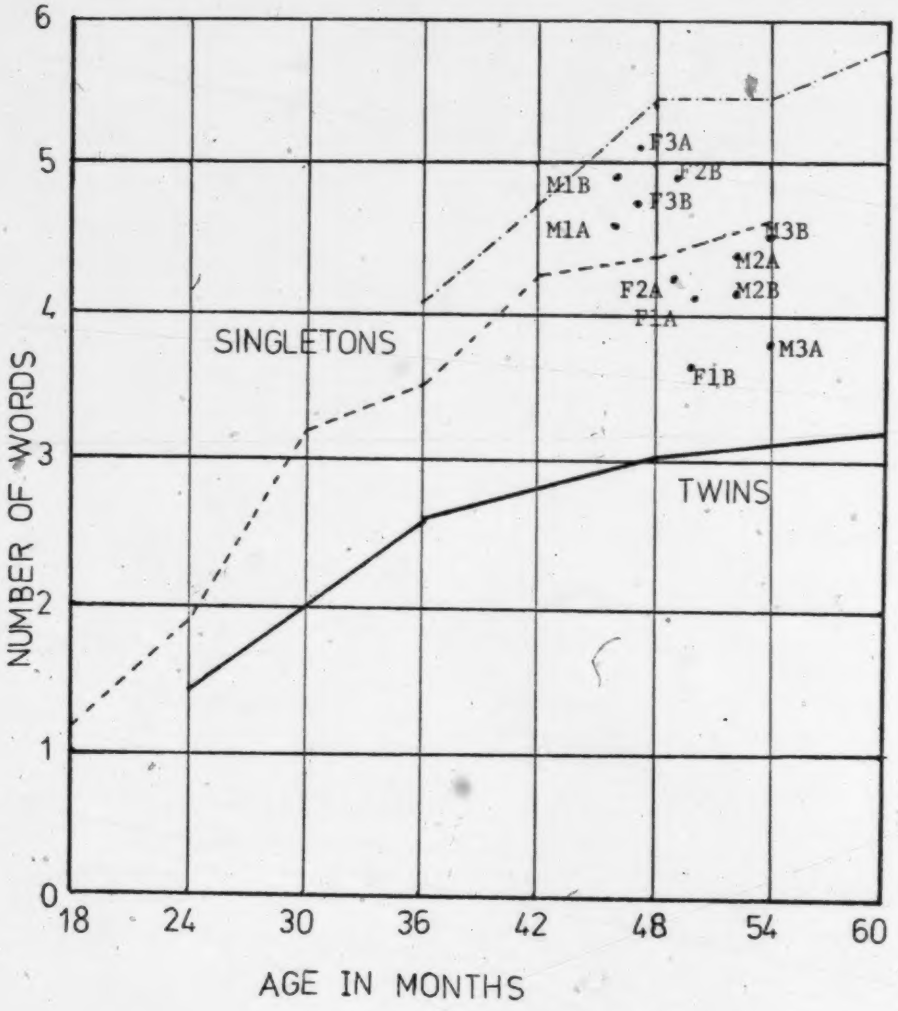
Comparisons of M.L.U.

The relative mean length of utterance of the twins in this study and the mean length of utterance of the subject in the studies by Day (1932), and Templin (1957) are illustrated in Figure IV _C.

As is evident from the graph, all of the children in this study performed better in mean length of utterance than did the twins in the Day (1932) study. Some of the twins performed better than did the singletons reported by Day as is evidenced by the position of M1(A&B) F3(A&B) and F2B. Possibly the difference in findings can be attributed to either the definition used for M.L.U. or from the use of manual recording of samples by Day (1932). The twins studied all scored

FIGURE IV- C

MEAN LENGTH OF UTTERANCE FOR SINGLETONS AND TWINS BY C.A.



Templin (1957)—·—·—

Day (1932)----- ———

somewhat lower than did the sample of regular children as recorded by Templin (1957).

Summary of Mean Length of Utterances

The findings of the analysis of the Mean Length of Utterances are summarized as follows:

1) The simple t-test revealed no significant difference between the mean length of utterance for the dominant and subordinate groups.

2) The mean length of utterance for the twins in this study was approximately equivalent to the mean length of utterance for the singletons in the study by Day (1932).

3) The mean length of utterance for the twins in this study was somewhat higher than the M.L.U. of the twins in the study by Day (1932).

Use of Pronouns

Trantham and Pederson,(1976) state that the emergence of pronouns is developmental in normal children.They stated that the use of pronouns could be observed in very definite patterns of development. The Trantham and Pedersen (1976) guide for pronoun development, located in Chapter II, Figure II-D, shows the developmental emergence of pronouns in normal children.

The entire protocol of each subject was analysed on the basis of the number of pronouns used, as well as the number of erroneous attempts at pronoun use. The correct occurrences of pronoun forms were indicated with an X and the erroneous occurrences were assigned an O as is illustrated in Table IV-8. The gross count of correctly used pronoun forms for each twin reveals a definite directionality in favor of the subordinate co-twin. The dominant child in each pair used fewer pronoun forms than did the subordinate co-twin. Twin pair M2 (A&B), the pair where dominance was not established, were the exception as M2A (dominant) used 11 pronoun forms while M2B used 10 pronoun forms. Subject F3A (dominant) used 14 pronoun forms, F[illegible]B used 23 pronoun forms while subject F1A and F1B used 11 and 13 respectively. Again,the subordinate child appears to have developed language skills in advance of the dominant co-twin.

Erroneous Pronoun Use

The analysis of the error patterns used by the children revealed an advancing or learning process was involved with pronoun use.

TABLE IV-8
Twins Pronoun Use

Pronoun	Twin											
	M1		M2		M3		F1		F2		F3	
	A	B	A	B	A	B	A	B	A	B	A	B
Indefinite												
it	X	X	X	X	X	X	X	X	X	X	X	X
some		X	X	X	X				X	X		X
nothing					X							
somebody	X	X		X	X	X					X	X
anything				X		X						
few, both						X	X			X		
Personal												
you	X	X	X	X	X	X	X	X	X	X	X	X
me	X	X	X	X	O	X	X	X		X	X	X
we	X	X			X	X			X	X	X	X
them		X	X					X	O	X		X
I	X	X	O	X	O	X	X	X	X	X	X	X
he	X	X	X	O	X	X	X	X	X	X	X	X
her	O	X		O				X	X	X		O
they	X		X		X		X	X		X		X
him		O							X	X		X
she		X				X	X	X	X	X	X	X
those	X	X	X	X			X	X	X	X	X	X
us	X											
Possessive												
my	X	X	X	X	X	X	X	X	X	X	X	X
his		O	X				X	O		X	O	X
your	X				X	X		X	X		X	X
mine	X	X						X		X	X	X
her	X							O	X	X		X
our	X	X	X	X	X	X			X	X		X
their									X	X	X	X
Reflexive		2										
Wh- Pronouns		2			1				1	1	1	3
TOTAL	15	19	11	10	12	13	11	13	16	21	14	23

X correct use
O erroneous use

✓

The twins' language samples were analysed on the basis of the number of pronouns used while considering the number of erroneous attempts at pronoun use. (Table IV - 8) A definite directionality is exhibited by the pronoun use in favor of the subordinate co-twin. The dominant child in each pair (M2 exception) used fewer pronoun forms than did the subordinate co-twins.

Analysis of error patterns revealed that the dominant child's erroneous use of a pronoun form was correctly used by the subordinate member of the pair. Both of the twins in twin pair M1 attempted to use "her". However, illustrated in the following examples, the subordinate child M1B used "her" correctly while M1A dominate co-twin used "her" erroneously.

e.g. M1B: "This baby bear sees her in bed."

M1A: "Her's Goldilocks and her shut her eyes.
... and then he her he throw her out."

The pronouns erroneously used by a subordinate member were not attempted by the dominant child which suggests that initial attempts at use were often erroneous, and correct use indicated acquisition of the pronoun form into the language.

The members of twin pair F3(A&B) did not correctly use the personal pronoun "her" in their language protocols. However, F3B (subordinate) attempted to use "her" but used it erroneously.

e.g. F3B: "Look what happened to she hers."

Peculiar pronoun uses were exhibited in the language sample by some of the twin pairs. For example, twin pairs M2 (A&B) and F1 (A&B) did not use the personal pronoun "we" at all. All the other twin pairs used "we" correctly. It is interesting to note that these children had parents who read to their children far less than did the parents of the other children. The pronouns "it", "you", and "my" were the only pronouns used correctly by all the subjects. "I" and "he" were attempted by all the children but errors did occur in use. In twin pair M3(A&B), child M3B correctly used "I" and "me", but as the example illustrates, the dominant co-twin M3A erroneously used the personal pronouns.

M3A: "me want paper! Me keepin these,
me are me are! Keepin these me are."

In the language situation only M1A used the pronoun "us".

M1A: "Where the telephone you gived us?"

The subordinate co-twin M1B was the only child to use the reflexives "myself" and "herself".

M1B: "I hurt myself on my bike."

M1B: "He had a bandage on,
on him's nose and hurt himself."

The sex of the pair seems to have been an influencing factor in the use of the pronoun "she" as all females used the personal pronoun "she" correctly, whereas only two males, M1B and M3B, exhibited the use of "she" in their language. Again, it is the subordinate child in the male pairs that used the pronoun form.

Possessives

The emergence of the seven possessive pronouns is developmental. However , with only seven possessives no statistical analysis was undertaken on the occurrence. As is shown in Table IV-8 the subordinate child in each twin pair attempted to use correct possessive forms more often than did the dominant counterpart. Except for twin pair, M3(A&B), the members were identically matched in possessive use. The pair M3, however, used only proper names when referring to co-twin ownership. They often referred to items by "our" whether or not joint ownership was involved.

e.g.

M3B: "Written our names that."

M3B: "We don't know where got that.Our mom gave away. Our mom are showing(other twin's name) how to write name."

M3A: "Me don't want our mom to,me wantyou to."

The possessive pronouns "his" and "her" were sources of erroneous forms being employed or attempted, as is evident in the following example:

e.g.

F3A: "Had to go out of he's way."

F1B: "Thats he's tongue."

F1B: "She's looking in she's house."

For the purpose of eliciting language which might contain possessives the Mirror task proved to be effective.

Summary of Pronouns Use

The findings of the analysis of pronoun forms are as follows:

1) The subordinate co-twin in each twin pair, except in twin pair M2, used more pronoun forms correctly than did the corresponding dominant co-twin.

2) The occurrence of erroneous pronoun forms in the language of a child concurred with previous literature which stated that the child is attempting to incorporate the pronoun form into the language.

3) The analysis of instances of erroneous pronoun forms being used by subordinate twins revealed that the forms were not being attempted by the dominant co-twin.

4) The analysis of instances of erroneous pronoun forms being used by dominant twins revealed that the forms were used correctly by the subordinate co-twin.

Use of Interrogatives

The emergence of interrogatives is developmental (Trantham and Pedersen, 1976). The developmental emergence sequence chart is located in Chapter II Figure II - E.

The entire language sample for each child was analysed in terms of the number of interrogative forms used. The number of the interrogative forms used by each child was grouped according to twin dominance or subordinance. The results of the t -tests appear in Table IV-9.

TABLE IV - 9

Use of Interrogatives by Group

Group	Mean	S.D.	t- value	df	Prob. level
Dominant A	2.50	1.89			
Subordinate B	5.33	3.54	3.576	5	.016

The simple t-test revealed that the differences between the means of the two groups was statistically significant for these children at .05 level of significance. These results provide evidence to show that the subordinate twins (mean 5.33) used nearly twice as many interrogative forms as did the dominant co-twin, A (mean 2.50).

TABLE IV-10

Twins Use of Interrogatives

	M1		M2		M3		F1		F2		F3	
	A	B	A	B	A	B	A	B	A	B	A	B
where are												
what's that	X	X	X	X			X	X	X	X	X	X
what happened						O						
who is it	X	X										
why	X	X	O	X						X		
is (reversal)	X	X								X	X	X
what----ing					O				X			
would												
what's that (object)		X										
where is	O		O	O		O			X	X	X	
tag?		X			O	X		X		X	X	X
do (reversal)										O		X
what do, does, did	O	O								X		X
can									X	X		X
did			O		O							
where did												
where----ing												
how	O	O		O	O						O	X
what are											X	X
will												
are these												
how come												X
does												X
could						X				X		X
whose		X										O
(aux) is												
when												
	4	7	1	2	0	2	1	2	4	8	5	11

X correct use
O erroneous use

The correct use of an interrogative form by a subordinate twin and the erroneous use of the same form by the dominant co-twin occurred in only two instances in the language samples. As shown in Table IV-10, twin pair F3(A&B) attempted "How" questions and twin pair M2(A&B) attempted "Why" questions, illustrated by the following examples:

F3B: How does this go?

F3A: How's is this open?

M2B: It's turning around. Why?

M2A: Why need these them things?
Why need this?

The children used other erroneous interrogative forms such as:

F3B: Whose this is?

M1B: How puts this on?

M1B: Why you got so every papers?

M1A: Why is got holes everywhere?

M3A: What doing?

M3A: How he takin it away?

M2B: How you take this head off?

M2A: Did you got this?

The earliest method of asking questions for the child is a rising inflection on the utterance. The findings in this study support the findings of Menyuk and Bernholtz (1969), Brown (1963) and Trantham and Pedersen (1976) in the use of the intonation interrogative as an early interrogative form.

All the subjects in this study used an intonation pattern to effect interrogative meaning on a declarative statement. Several examples follow:

F3A; You hate tigers too?

F2B: What? The mailman?

F3B: Two cars?

M1A: They have"garillas"at ours?

M3A: Take one you eat it?

M3B: You want hear story?

M2B: It's plug on?

M2A: It is frozen things?

Although the forms varied from those of standard English,all the questions asked were comprehensible in the context in which they were asked. The twins again appeared to have inaccurately replicated standard language rather than creating their own language as suggested by Hale (1886).

Summary

The findings of the analysis of the use of interrogatives are summarized as follows:

1) The mean number of interrogative forms used by subordinate twins in this study was significantly greater than was the number of interrogative forms used by the dominant co-twin.

2) All subjects relied on intonation inflections as one method of asking questions.

3) All interrogative forms were comprehensible in the context in which they were asked and showed no evidence of twins creating their own language.

Use of the Maze

The entire language sample of each subject was analysed to determine the number of mazes used. After the number of mazes were counted in each language sample the total was divided by the number of individual utterances and the results were converted to percentages. The percentage of utterances containing mazes is shown in Table IV-11. The means for the Dominant group A ranged from 7.2% to 29.4% while the means for the Subordinate group B ranged from 3.9% to 18.1%.

TABLE IV-11

Utterances Containing Mazes
By Twin Group

	Percentage					
Group	M1	M2	M3	F1	F2	F3
Dominant A	16.3	29.4	12.6	8.7	18.3	7.2
Subordinate B	7.5	18.1	4.9	3.9	13.1	12.6

The twin pair M2(A&B) used the greatest percentage of mazes 29.4% and 18.1% respectively.

The percentage of utterances containing mazes for each group, dominant and subordinate, were subjected to a simple t-test to establish t-test values and probability levels for the difference between means.

TABLE IV - 12

Mean Maze Use By Twin Group

Group	Mean	S.D.	t value	df	prob. level
Dominant A	15.42	7.36			
Subordinate B	10.02	5.02	1.087	5	.07

The results of the simple t-test, shown in Table IV - 12 reveal that there is no significant difference between the means of the Subordinate B (mean 10.02) and Dominant A (mean 15.42) groups for maze usage.

When Developmental Sentence score and maze use were compared no pattern was evident. F3A and F2A both had Developmental Sentence scores of 6.02, whereas they used mazes in 7.2% and 18.3% of their utterances, respectively. One of the sets of twins with the lowest Developmental Sentence scores, F1(A&B) used fewer mazes than any other pair. Although it cannot be said why F2B used mazes in 18.3% of her utterances, a good number of the mazes occurred as the subject edited or corrected errors in her speech.

Summary

The percentage of mazes used by the subordinate and dominant twins in this study is not significantly different.

Situation Specific Language

The language samples obtained in this study were observed for instances of autonomous words or words which carried meanings other than would be comprehended in standard English.

Language which was comprehensible only in the situation in which it occurred and autonomous word usage were observed in the language of the male twin pairs M2(A&B) and M3(A&B). The parents of M2(A&B) indicated that the twins were read "very few stories" and that the children "played together out of the way" most of the time. The parents of M3(A&B) stated that when M3(A&B) were little, the children were "on their own fairly often" and heard "very few stories."

The parental attention and supervision, or lack thereof, seems to be a contributing factor in stimulating the use of odd forms of language, in the children in this study. The following examples of situation-specific-meaning-confusions illustrate the implicit use of language where more explicit language is necessary for total understanding.

M3A: "This guy now me see who."
(interpreted as: M3A pointing to his mirror image. This guy here in the mirror is me. That's now who I see.)

M3B: "M3A puttin bag, are put in bag."
(interpreted as: M3A, I am putting my papers in the bag, your papers were already put in the bag.)

M3A: "Turn way."
(interpreted as: You turn it [record player] on.)

M2B: "Not plug on."
(interpreted as: It [tape recorder] is not plugged in or not turned on.)

M2B: "Some fixes over here broke."
(interpreted as: Something that needs fixing on this toy over here is broken.)

M2A: "That all pichers?"
(interpreted as: Is that book all full of pictures?)

M2B: "Those kittie play a wa all tangled up a wa."
(interpreted as: Those kitties were playing with string and were all tangled up.)

M2A: "Horsie suckes a dad."
(interpreted as: The little horse (colt) sucks or nurses at the adult (mother)

The samples appear to be forms of the language not dissimilar to what might be classed as "baby talk" or immature forms of standard adult English rather than the creation of their own language.

The statement by Luria and Yudovich (1959), in their study of a pair of twins, indicated that the children with the delayed language were from a home where "the twins spent most of their time in play with each other; there was nothing organized to keep them occupied and they were usually left on their own. They never heard a book read, nor were they told stories, and they only listened to strangers talking if they heard their own names mentioned." (p. 33)

Luria and Yudovich reported that the language used by the twins was typical or "proper to a considerably earlier phase of speech development, such as usually observed in children towards the end of the second and beginning of the third year of life." (p. 38) The twins in this study, although younger chronologically by approximately one year than were the twins in the Luria & Yudovich (1959) study,they did not fall drastically behind normal children.as did the Luria twins.

The males in this study had somewhat lower Developmental Sentence Scores than did normal children, but did not use as great a percentage of utterances which were incomprehensible out of context.

The situation specific language was taken to be the utterances which the investigator felt would not normally be understood if the reader (listener) were not present to see the stimuli with which the twin was involved. A simple count of these utterances was made and compared to the total number of utterances, in order to derive percentages for each twin. A second judge, a graduate student in secondary English, checked the protocols for situation specific language. The percentages are shown in Table IV-13.

TABLE IV-13

Percentage of Situation Specific Language

By Twin Group

Group	M1	M2	M3	F1	F2	F3
Dominant A	3.2	6.2	6.3	0	0	0
Subordinate B	1.0	6.0	6.5	1.6	0	0

The percentage of situation specific language used by the twins represented approximately 6 percent of the utterances used by male twin pairs M2 and M3. The small percentages used (M3A-6.3%, M3B-6.5%, M2A-6.2%, and M2B-6.0%) do not appear to be significant in occurrence. However, as has already been stated the lack of parental interaction may be a causal factor for a portion of the situation specific language used by M2 (A&B) and M3 (A&B). All the male pairs used some situation specific language, but only one female (F1B) used situation specific language(1.6%).

Luria and Yudovich (1959) stated that the twins they observed used words with diffuse meaning at a rate of approximately 41.4 percent of the total number of words. Almost all of the expressive sentences of the Luria and Yudovich twins A&B, 82.6 percent and 78.2 percent respectively, were comprehensible only in the context of the situation.

As the investigator was able to understand everything the twins uttered during the interviews he did not find any instances of these children creating a language of their own.

Summary

The findings of the descriptive analysis of the use of situation specific language are summarized as follows:

1) The males in this study produced between 1.0% and 6.5% utterances which were considered to be incomprehensible out of the specific context in which they were used.

2) The situation specific language used by each co-twin was restricted to that twin only. No common situation specific language was used by both members of a twin pair.

Additional Observations

Because the subjects in this study were identical twins, the identification of each child was complicated. The twins in each pair looked so much alike that the examiner would have been unable to distinguish between co-twins without a plan for identification. Fortunately, in each case, one twin was wearing a garment that differed from the co-twin. During the sessions, while the examiner was taking notes, the twins were distinguished and identified by applicable differences in clothing such as blue socks and red socks or shoes and no shoes. When the language samples were transcribed, each child's proper name and code label was substituted for the clothing designation.

Task Involvement

All the tasks seemed to be effective in providing language stimulus. The task involving the box of toys was, in all instances, met with whoops of excitement. All pairs were eager to explore the box and everything in it. No prompting or other stimulation of any kind was needed to elicit language. The stimulus materials in this study seemed to be very effective. Contrary to Davis (1937), who stated that "no play object was found of equal interest to both boys and girls" (p. 20), the telephone and music-box-record-player were of equal interest to both boys and girls and were very useful in stimulating language.

The examiner enjoyed the observation sessions and was somewhat amused by the intonations and expressions used by the subject. The mirror task was met with some selfrighteous indignation as the subjects informed the examiner of limb possession. "My hand" or "mine" held the intonation of "What is the matter with him, any one can see it's my hand." No child resisted or hesitated at the task as they all evidently wished to identify for the examiner whatever was requested.

The examiner attempted to observe the handedness of each child, but constant shifting to preferred hand in most cases revealed that the children had not yet settled on a dominant hand.

Parent Involvement

All of the parents expressed an interest in this study and a desire to be of assistance in furthering the research on twins.

The examiner was concerned initially with causing embarrassment to any parent who might be illiterate but all the parents interviewed indicated they could read. The examiner observed a considerable difference in attitude expressed by the parents towards the performance of their children. The parents of the twins living in the restricted economic environment were apologetic for their children's language and expressed a desire to speak for their children. Conversely, the parents in the affluent economic environments were somewhat more confident about their children's ability.

III. REVIEW STATEMENTS

In this chapter, the findings relative to the language performance of six pairs of four-year-old identical twins were reported. Four tasks were designed to stimulate oral language utterances from the subjects. The members of each twin pair were placed in a group according to role assumed in the twin relationship, either dominate or subordinate.

The utterances were examined and analyzed to determine the effect of the dominate grouping on: 1) Developmental Sentence score, 2) Mean length of utterance, 3) pronoun and possessive usage, 4) interrogative usage, 5) maze usage, and 6) occurrence of situation specific meaning confusions. A summary of the findings is given in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The present study was undertaken in order to examine the language performance of four-year-old identical twins. The intent of the study was to examine the effect that a dominance-subordinance role relationship had on the language performance of identical twins. The study was also intended to examine the occurrence of twins creating their own language. A summary of the design of the study and procedures begins this chapter, followed by the findings of the study. The statement of the conclusions, implications for education, and suggestions for further research conclude the chapter.

I. SUMMARY OF THE STUDY

The summary is divided into two sections; 1) Design and procedures and 2) Findings of the study.

Design and Procedures

In order to examine the language performance of identical twins, six pairs of four-year-old identical twins were given four language stimulus tasks. The subject, three male and three female pairs of identical twins, were all residents of the Greater Metropolitan Area of Edmonton, Alberta and were members of the Edmonton Twin and Triplet Club. The subjects were all observed in their own home.

Four major oral language stimulus tasks were used to stimulate oral language utterances from each child. The four tasks were: 1) Mirror Task,eliciting language from both twins together in front of a mirror, 2) McCarthy and Day Task,stimulating spontaneous language utterances in a play situation both members playing together, 3) Twin with Adult Task,eliciting language from individual twin members responding to examiner questions, 4) Story Task,eliciting language from each twin member as (s)he related and retold a story to the examiner.

The utterances were tape recorded, accompanied by examiner notes, and later transcribed to written protocols.

The study focused on the following questions:

1) Does an inverse relationship exist between twin dominance and language ability in the use of language and the structure of the language performed?
(i.e. the dominant child having the lesser language ability)

2) To what extent do identical twins use situation specific or autonomous language? (i.e. language which creates meaning confusions when not totally situation maintained.)

3) Is there evidence to support the Hale (1886) theory that twins, to some extent "create their own language"?

The language samples generated were analysed in terms of the effect of dominance of the twins on:

1) Developmental Sentence Scores.

2) Interrogative forms used.

3) Mean length of utterance.

4) Pronoun usage.

5) Maze usage.

6) Occurrence of autonomous utterances.

The reliability of the analysis was established by two judges.

In order to establish dominance for each twin pair three-way agreement was necessary. The three methods used to establish dominance were:

1) examiner observation of aggressive acts for acquiring stimulus items.
2) parental statement of the dominant twin.
3) analysis of the Temperamental Quality Inventory completed for each child by the parents.

Summary of the Findings

The findings of this study suggested characteristics of the language performance of the identical twins observed. The findings are organized according to the analysis of the dominance of the subjects, followed by the analysis of the language samples of the twins.

Dominance The identical twins in this study were observed for dominance and five dominant co-twins out of six pairs of identical twins were identified. The characteristic temperamental quality traits exhibited by the dominant child were: a high activity level, a variable rhythmicity, an adaptive adaptability quality, an approach withdrawal quality and a positive quality of mood. The characteristic temperamental quality traits exhibited by the subordinate child were: a moderate activity level, regular rhythmicity, variable approachability and adaptability qualities, and a variable quality of mood. It was established that the dominant child was physically more aggressive than was the subordinate co-twin.

Developmental Sentence Score The findings of the analysis of the Developmental Sentence Scores based on 50 selected utterances provided evidence that the subordinate twin in each twin pair had a significantly higher Developmental Sentence Score (DSS) than did the dominant co-twin. The male twins in this study had lower DSS than did the female twins.

Four of the six pairs of twins had Developmental Sentence Scores which fell below the 10th percentile of DSS for normal population children.

Mean Length of Utterance The analysis of the mean length of utterance of each twin did not reveal any significant difference between the means of the dominant and subordinate group. The mean length of utterance for the twins in this study were above the MLU for twins in the study by Day (1932).

Use of Pronouns The subordinate child in each twin pair used more correct pronoun forms than did the dominant co-twin. The occurrence of erroneous pronoun forms suggested that the child was attempting to incorporate the form into his language. Instances of use of an erroneous pronoun form by a dominant child was usually accompanied by the correct use of the pronoun form by the subordinate child. The erroneous pronoun form used by the subordinate child was not attempted by the dominant co-twin.

Use of Interrogatives The mean number of interrogative forms used by the subordinate twins was significantly greater than was the number of interrogative forms used by the dominant co-twins. All subjects in this study relied on the use of intonation inflections as one method of asking questions.

Use of the Maze The number of mazes used by the subordinate group was not significantly different from the number of mazes used by the dominant group.

Situation Specific Language The males in this study produced a limited number of utterances which were incomprehensible out of the specific context in which they were used. The situation specific meaning confusions used by each child were restricted to that child only. No common situation specific meaning confusions were used by both members of a twin pair. No evidence was found in this study to indicate that twins create their own language.

II. CONCLUSIONS OF THE STUDY

Within the limitations of the study conclusions have been drawn regarding the language performance of the identical twins in this study. The conclusions are stated in relation to the research questions proposed.

Research Question 1

Does an inverse relationship exist between twin dominance and language ability in the use of language and the structure of the language performed?

In the twin pairs in which dominance subordinate relationship was determined, evidence was found to support the hypothesis that the subordinate child would exhibit the better language ability. The subordinate member of the identical twin pair had higher Developmental Sentence Scores, used a greater number of pronoun forms and also used a greater number of interrogative forms that did the dominant member of the pair.

Perhaps, in considering the language ability differences that are exhibited between members of an identical twin pair, the environmental situation that is created by a twin pair should be examined. The child in the subordinate role of the identical twin relationship is placed in a social situation which demands greater mastery of the language. The dominant twin seems able to satisfy his wants and needs by was of aggressive acts and a domination of the activities in any situation. The subordinate child must learn to verbalize his needs much more clearly and precisely in order to appeal to the surrounding adults for need and want satisfaction. The development of the language ability becomes a successful means of satisfying needs so the subordinate twin continues to improve his grasp on the language.

Research Question 2

To what extent do identical twins use situation specific or autonomous language?

It is evident that the twins in this study used very little autonomous language. The males who used some situation specific meaning confusions used them at a maximum rate of 6.5 percent of the total number of utterances. The use of autonomous language appeared in the language of the twin pairs who were set to play together on their own on frequent occasions. The children sent to play together on their own were not provided with language examples and reinforcement of standard adult English. The twins using the autonomous language were from homes where the parents stated that they seldom read stories to the children. This again reflects the lack of reinforcement and the lack of example of standard forms of the language.

The male twins placed their own non-standard utterances into the language as if to assume that everyone could understand them.

Research Question 3

Is there evidence to support the Hale (1886) theory that twins to some extent, " create their own language "?

No evidence was found in this study to support the Hale (1886) theory that the identical twins " create their own language". The fact that the autonomous language used by each child was specific only to that child, provides some evidence to support the hypothesis that these twins were using inaccurate replications of standard language forms.

III. IMPLICATIONS

Implications

The findings presented in this study have certain implications for research and education.

Research An instrument such as the Developmental Sentence Score shows considerable potential for becoming an accurate measure of language performance if some modifications, such as adjectival and adverbial recognition, were included.

Education The observation that identical twins could be delayed in language development should prompt the educator to view the language performance of twins very early and or help the children develop their language. A potential need for clinical assistance with language should be given consideration as the children might benefit from individualized language training. As well, the educator should consider the placement of twins in separate versus common classrooms.

In the classroom, situations must be established which would create the need for the co-twins to use language. In the playschool or kindergarten situation, children need not only to use and practise language, but they must also be presented with language models which they might follow.

IV. RECOMMENDATIONS FOR FURTHER RESEARCH

1) A longitudinal study should be conducted which follows identical twins from preschool through the first years of school in order to identify whether or not a reversal in role dominance takes place. The change from a dominant role because of aggression to a subordinate position because language is not as well developed requires study.
2) The Developmental Sentence Score as a measure of language ability requires some further modification in order to account for the developmental aspects of adverbials, adjectivals, prepositionals and word order.
3) The use of the interrogative forms as a measure of language development should be pursued in order to establish its validity as a measure of language ability.
4) Further research with twin pairs is necessary to continue the study of twins who have poorly reproduced standard English.
5) The effect of socio-economic status on the language of twins should be pursued in research.
6) Further research with twins is necessary to fully establish the development of temperament and its effects on the dominance-subordinance relationship.

V CONCLUDING STATEMENTS

The identical twins in this study exhibited dominant and subordinate role relationships which effected the language ability of the members of the twin pair. The dominant child lagged somewhat behind the subordinate co-twin in language ability. The use of autonomous language was restricted to a very small percentage of the utterances of the male twin pairs. The twins did not reveal any created language but rather showed what appeared to be poor replication of adult or standard English. Hopefully this study will contribute to the knowledge about the language performance of identical twins since it revealed some of the language differences between members of identical twin pairs.

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APPENDICES

APPENDIX A

INTERVIEW PROCEDURES AND TASK INSTRUCTIONS

I Interview with Parent

Procedures for parental interview were as follows:

1. Explain the reason for the study.
2. Learn the names ages of children.
3. Determine the parents perceived view of the following for each child:
   (1) language ability.
   (2) age when children began talking.
   (3) frequency and regularity of story reading (telling) to the children.
   (4) temperamental quality as per Thomas, Chess and Birch personality check list, (one per child).
4. Explanation of the need for tape recording plus taking notes.
5. On completion of language sampling, ascertain the parents perceived view of the dominance of the twin pair, both the physical and oral dominance.

II Tasks

Mirror Task

Twins together in front of Mirror

Let's look in the mirror. I am going to ask each of you some questions which I would like you to answer.

Can you, _____(twin's name), tell me what this is?
(reflection of his/her hand).

Can you, _____(co-twin's name), tell me what this is?
(reflection of co-twin's foot).
(etc. for arm, chest, stomach, back).

What am I pointing to, ____(name)?
(reflection of co-twin's hand).

What am I pointing to,_____(twin's name)?
(reflection of co-twin's foot).
(etc. for other parts, head, neck, leg).

Whose nose is this,____(twin's name) (co-twin's nose) etc.

Whose ear is this,____(co-twin's name) (twin's ear) etc.

III Twins with Adult Task

I am going to let you look at this box of things which I brought for you to see. You may play with them while I am here. You two (boys/girls) may explore the things in the box and tell each other about what is inside. You may ~~take~~ them out of the box and play with them here.

IV McCarthy Day Task and Story Task

_____(Twins's name), what did you like the best from the box of things I brought?

Could you tell me all about the ....?
Why do you like it/this?
What is it for?/ How does it work?
Tell me about the other things in the box.
Can you tell me what colors are on the ......?
Does your mom/dad ever read or tell you stories?
Do you have any books with stories in them?
Can you tell me a story?
Please tell me a story.

Twin's name: Do you know the story of Goldilocks and The Three Bears? Can you tell me that story?

Look at this book (twin's name). Can you tell me a story from the pictures in this book?

APPENDIX A-2

SUMMARY OF AGGRESSIVE ACTS FOR EACH TWIN AS COUNTED BY THE INVESTIGATOR

TWIN	PROXIMAL INTIMIDATION	HITTING STRIKING	PUSHING SHOVING	SNATCHING GRABBING	TOTAL
M1A	1	6	3	2	12
M1B		1	1	2	4
M2A	2	2	3	4	11
M2B	1	2	1	1	5
M3A		11	6	4	21
M3B		6	1	2	9
F1A	3	2	2	1	8
F1B			1	2	3
F2A	1	4	3	10	18
F2B	2	1	2	1	6
F3A		1	2	1	4
F3B	1				1

APPENDIX B

SURVEY INSTRUMENT

(Temperamental Quality Inventory,
Thomas Chess & Birch, 1970)

Temperamental Quality	Rating Scale		
1) Activity level: description of motor behavior - is the child highly active? or the opposite? when eating, playing, sleeping, etc.	high	moderate	low
2) Rhythmicity: cyclicality of behavior - is behavior predictable? i.e. sleep for 4 hours wake for 4, eat at regular intervals? or irregular and difficult to predict.	regular	variable	irregular
3) Approach or withdrawn: Did (does) the child move toward or away from new stimuli?	approach	variable	withdrawal
4) Adaptability: Did (does) the child adjust easily to new situations (after the initial approach or withdrawal phase) or did it take some time to adjust to new situations?	adaptive	variable	non-adaptive
5) Intensity of reaction: a measure of the strength of response - did(does) the child respond with a whimper or a scream? with vigor or with little energy?	intense	variable	mild
6) Threshold of responsiveness: (the smallest amount of energy necessary to evoke a response) i.e. high noise to bother child, then high threshold, little noise, then low threshold.	high	moderate	low
7) Quality of mood: Generally pleasant and friendly? Positive. Generally unpleasant and unfriendly? Negative. (Positive smiles and laughs a lot; negative cries and frowns alot.)	positive	variable	negative
8) Distractibility: Once engaged in given behavior, was it easy to alter this behavior? i.e. by calling child to dinner? Was he/she easily highly distractible in that external stimulation would easily change his on-going behavior? Or was he/she hard to distract?	yes	variable	no
9) Attention span and persistence: How long did(does) the child tend to stay at a given task? Few minutes? (low attention span and persistence) Long time? (high attention span and persistence.)	High	variable	low

APPENDIX B-2

SUMMARY OF THE TEMPERAMENTAL QUALITY RATINGS OF EACH TWIN AS DETERMINED BY HIS/ HER PARENTS

1) Activity level	high M1A F1A M3A F2A F3A	moderate M1B F2B M3B F3B F1B M2A&B	low
2) Rhythmicity	regular M1B F2B M3B F3B F1A&B M2A&B	variable M1A F2A M3A F3A	irregular
3) Approach or withdraw	approach M1A F1A M2A F2A M3A F3A	variable M1B F2B M2B F3B M3B	withdraw F1B
4) Adaptability	adaptive M1A F2A M3A F3A F1A M2A&B	variable M1B F2B M3B F3B	nonadantive F1B
5) Intensity of Reaction	intense M1B F3A F1A&B	variable M1B F3B M3A&B M2A&B	mild F2A&B
6) Threshold of Responsiveness	high M1A&B F1A&B M3A&B F3A&B M2A&B	moderate F2A&B	low
7) Quality of mood	positive M1A F1A M3A F2A M2A&B F3A	variable M1B F2B M3B F3B	negative F1B
8) Distractibility	yes M1A&B	variable M3A&B F2A&B M2A&B F3A&B F1A&B	no
9) Attention Span	high	variable M2A&B F2A&B M3A&B F3A&B F1A&B	low M1A&B

APPENDIX C

DEVELOPMENTAL SENTENCE SCORE CHART

(Lee & Canter, 1971)

SCORE	INDEFINITE PRONOUNS OR NOUN MODIFIERS	PERSONAL PRONOUNS	MAIN VERBS	SECONDARY VERBS	NEGATIVES	CONJUNCTIONS	INTERROGATIVE REVERSALS	WH QUESTIONS
1	it, this, that	1st and 2nd person: I, me, my, mine, you, your(s)	A. Uninflected verb: *I see you.* B. copula, is or 's: *It's red.* C. is + verb + ing: *He is coming.*		it, this, that + copula or auxiliary is, 's, + not: *It's not mine. This is not a dog. That is not moving.*		Reversal of copula: *Isn't it red? Were they there?*	
2		3rd person: he, him, his, she, her, hers	A. -s and -ed: *plays, played* B. irregular past: *ate, saw* C. Copula: *am, are, was, were* D. Auxiliary *am, are, was, were*	Five early-developing infinitives: I *wanna see* (want *to see*) I'm *gonna see* (going *to see*) I *gotta see* (got *to see*) *Lemme* [to] *see* (let me [*to*] *see*) Let's [to] play (let [us *to*] *play*)				A. who, what, what + noun: *Who am I? What is he eating? What book are you reading?* B. where, how many, how much, what . . . do, what . . . for *Where did it go? How much do you want? What is he doing? What is a hammer for?*
3	A. no, some, more, all, lot(s), one(s), two (etc.), other(s), another B. something, somebody, someone	A. Plurals: we, us, our(s), they, them, their B. these, those		Non-complementing infinitives: I stopped *to play.* I'm afraid *to look.* It's hard *to do* that.		and		
4	nothing, nobody, none, no one		A. can, will, may + verb: *may go* B. Obligatory do + verb: *don't go* C. Emphatic do + verb: *I do see.*	Participle, present or past: I see a boy *running.* I found the toy *broken.*	can't, don't		Reversal of auxiliary be: *Is he coming? Isn't he coming? Was he going? Wasn't he going?*	
5		Reflexives: myself, yourself, himself, herself, itself, themselves		A. Early infinitival complements with differing subjects in kernels: I want you *to come.* Let him [*to*] *see.* B. Later infinitival complements: I had *to go.* I told him *to go.* I tried *to go.* He ought *to go.* C. Obligatory deletions: Make it [*to*] *go.* I'd better [*to*] *go.* D. Infinitive with wh-word: I know what *to get.* I know how *to do it.*	isn't, won't	A. but B. so, and so, so that C. or, if		when, how, how + adjective *When shall I come? How do you do it? How big is it?*
6		A. Wh-pronouns: who, which, whose, whom, what, that, how many, how much I know *who* came. That's *what* I said. B. Wh-word + infinitive. I know *what* to do. I know *who(m)* to take.	A. could, would, should, might + verb: *might come, could be* B. Obligatory does, did + verb C. Emphatic does, did + verb			because	A. Obligatory do, does, did: *Do they run? Does it bite? Didn't it hurt?* B. Reversal of modal: *Can you play? Won't it hurt? Shall I sit down?* C. Tag question: *It's fun, isn't it? It isn't fun, is it?*	
7	A. any, anything, anybody, anyone B. every, everything, everybody, everyone C. both, few, many, each, several, most, least, much, next, first, last, second (etc.)	(his) own, one, oneself, whichever, whoever, whatever Take *whatever* you like.	A. Passive with *get*, any tense Passive with *be*, any tense B. must, shall + verb: *must come* C. have + verb + en: *I've eaten* D. have got: I've *got* it.	Passive infinitival complement: With *get:* I have *to get dressed.* I don't want *to get hurt.* With *be:* I want *to be pulled.* It's going *to be locked.*	All other negatives: A. Uncontracted negatives: I *can not* go. He has *not* gone. B. Pronoun-auxiliary or pronoun-copula contraction: *I'm not* coming. *He's not* here. C. Auxiliary-negative or copula-negative contraction: He *wasn't* going. He *hasn't* been seen. It *couldn't* be mine. They *aren't* big.			why, what if, how come how about + gerund *Why are you crying? What if I won't do it? How come he is crying? How about coming with me?*
8			A. have been + verb + ing had been + verb + ing B. modal + have + verb + en: *may have eaten* C. modal + be + verb + ing: *could be playing* D. Other auxiliary combinations: *should have been sleeping*	Gerund: *Swinging* is fun. I like *fishing.* He started *laughing.*		A. where, when, how, while, whether (or not), till, until, unless, since, before, after, for, as, as + adjective + as, as if, like, that, than I know *where* you are. Don't come *till* I call. B. Obligatory deletions: I run faster *than* you [run]. I'm *as* big *as* a man [is big]. It looks *like* a dog [looks]. C. Elliptical deletions (score 0): That's why [I took it]. I know *how* [I can do it]. D. Wh-words + infinitive: I know *how* to do it. I know *where* to go.	A. Reversal of auxiliary have: *Has he seen you?* B. Reversal with two or three auxiliaries: *Has he been going? Couldn't he have waited? Could he have been crying? Wouldn't he have been going?*	whose, which, which + noun *Whose car is that? Which book do you want?*

PHOTOGRAPHIC PLATE
(following page)

A Stimulus array used for language tasks

B Book used for language story task

DEAN'S NEW GIFT BOOK OF
NURSERY RHYMES
Zoo Animals

PLATE A

PLATE B